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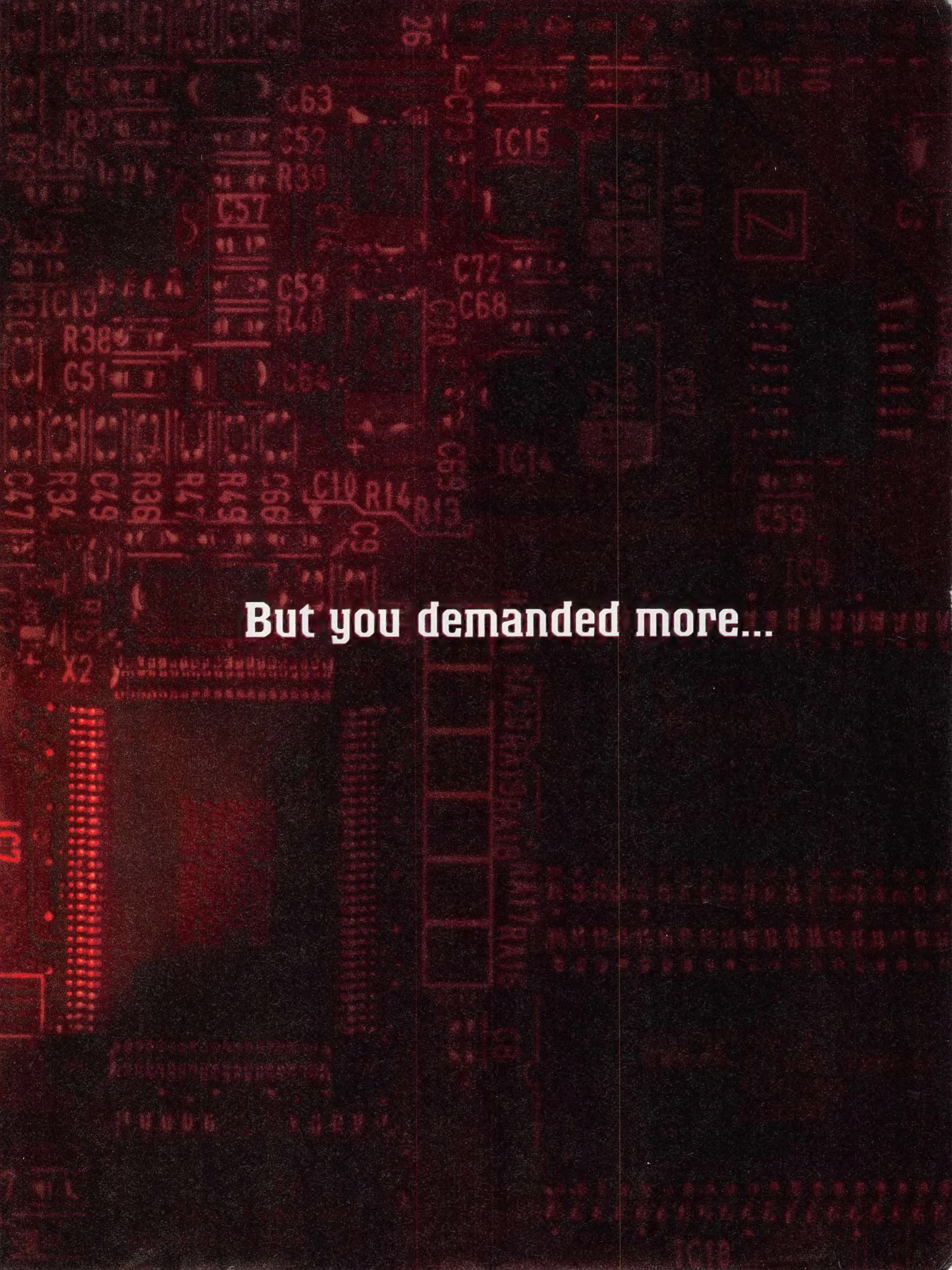

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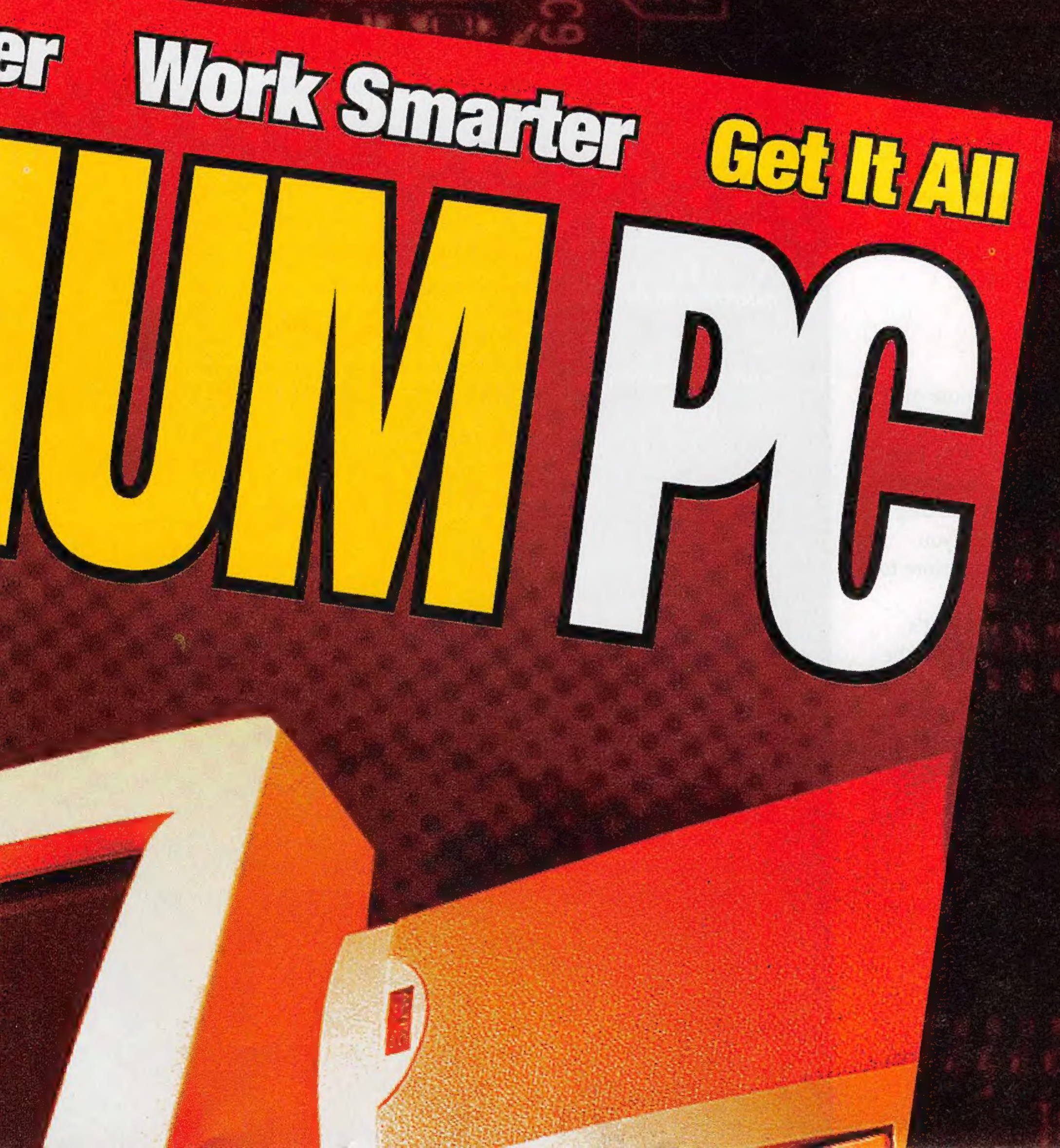
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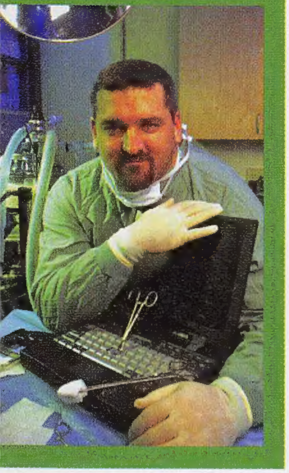

The Shape of Things to Come

The one thing the *boot* reader constantly demands is more. More power, more speed, more effects, more features. And based on the relentless flood of letters we receive—and a recent online thread on our bootNet web site—the fanatics want the same from *boot*.

More.

As bootReader Jim Martin put it: "Every month I look forward to receiving my copy of *boot* magazine, and I must compliment the staff, as it is the only magazine I read from cover to cover. The only problem is that this month's magazine took less than an hour to completely absorb. With a staff as good as yours, you should be able to easily crank out 150 to 175 pages a month of high-quality reviews, tips, and insight."

We have plans underway to **feed your need** for **more.**

And because *boot* exists to serve all PC junkies who share Jim's request, we have plans underway to feed that need and deliver just what you need. More.

More in-depth reviews.

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More cutting-edge tech news.

In a nutshell, *boot* plans to give you more of everything that makes this magazine/CD-ROM/web site/Internet radio show/IRC chat the very best.

To accomplish this, we have a few changes in store. Now don't get all skittish. We aren't talking about abandoning any of the goodness that you know and love. We're talking about adding more to all that goodness.

But one thing will never change. And that's the entire *boot* crew's devotion to providing you the Pure PC Power you deserve.

Keen-eyed readers will notice the dramatic four-page ad immediately preceding this editorial. Now, you didn't hear it from me, but that might have a little somethin' to do with what I'm talking about.

Eadem mutata resurgo,
Brad Dosland
Editor in Chief

Compaq Presario 5630, p.74

NEWS

20 **bootWire** News that **matters**. Microsoft unveils its vision for the **future of the web** and its convergence with the desktop. The **Chrome** system extensions take the burden off the bandwidth and puts it smack dab on the hardware. It's no surprise **Intel's onboard**.

VOICES

10 **Comm Port** The smartest **readers** in the world **speak out.**

25 **The Saint** **Alex St. John** ruminates on the **doomed Amiga OS** and its inspirational ties to his proposed DirectOS.

27 **Game Theory** **T. Liam McDonald**'s knickers are in a knot about an organization he likes to call the **Professional Lamers League**.

29 **On the Line** **Shel Kimen** dissed Macromedia last year, but this time out she's mighty impressed with the company's **flashing firecrackers**.

31 **Fast Forward** **Tom Halfhill** leverages his position as a senior editor at Byte to get the real story behind **Apple's recent benchmarketing**.

96 **Glitch** **Jon Phillips** took off early this month to go vacation in New York, and **this parody** is all he could manage before the door hit his ass.

THE TECH FILES

56 **White Paper** Editing the registry isn't for the weak of heart, yet **understanding the Registry** yields the keys to complete Windows mastery.

59 **12-Step/Clinic** The Clinic Check in and get a shot of PC knowledge to **salve that burning sensation** in your system.

P/REVIEWS & PRODUCTS

23 **Pure Lust** **Tech toys** for digital girls and boys.

62 **bootWorthy** This sexy gaggle of **printers** will have you hitting your Ctrl-P again and again.

68 **Previews** This month boot scores yet another hands-on exclusive. **Microsoft's first speaker system**—along with its **new gamepad** (codenamed: Tilt) and a **force-feedback steering wheel**—rock the bootLab.

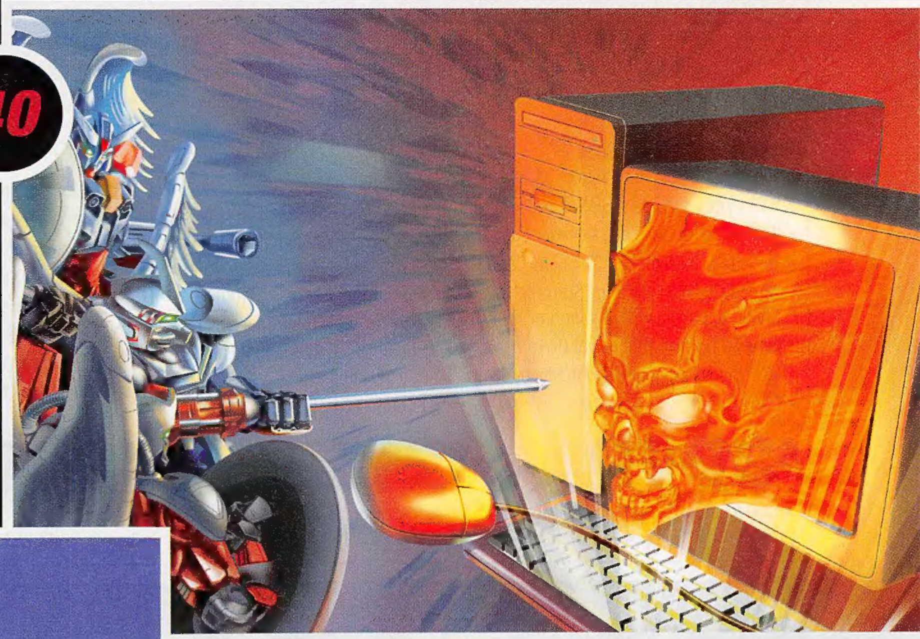
73 **Reviews** More of the sexy tech you love to lust after:
- Compaq's **400MHz comeback system** kicks some serious ass.
- The svelte **new Palm III PDA** proves the third time's a charm.
- A shotgun blast of assorted **soundcards and videocards** that'll blow you away.

Palm III, p.83

40

Utilities for the Damned

Your system begs for mercy as **demon glitches** afflict its performance and undermine its very stability. To resolve all your conflicts, **we tested all the top utilities head-to-head** on an identical hard drive image.



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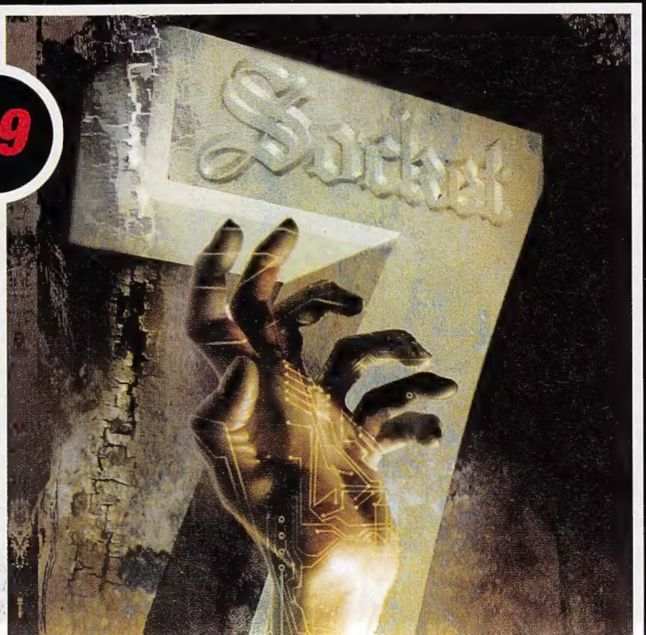
Lip

Sony, once the sleeping giant of the PC industry, is getting ready to awaken with a new line of VAIO desktop and notebook systems that promise to stomp on the competition. The man at the helm is **Wataru Ogawa**, president of the company's Information Technology division.

49

Socket 7: Life After Death?

Renegade mobo manus are resurrecting **the square CPU** that ruled supreme before Intel unleashed Slot 1 on a Pentium II–hungry public. We review **six new motherboards** that promise a high-performance alternative to Intel's juggernaut.



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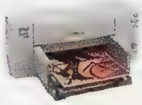

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COMM PORT

Fear And Loathing In Comm Port

I am finishing my graduate degree, and I have accepted a job in the PC portables industry. I was interested to see your cover story about notebook autopsies (*boot* 20). Unfortunately, I only got to pages 7 and 8 before I put the magazine down in disgust.

Your Comm Port section was incredibly offensive. I understand you have no control over what your readers write in to you, but you do have control over what you print and in what context you print it.

I was first offended by the letter titled, "The Bleeth Shall Inherit the Earth," accompanied by a picture of Pam Dawber. Comparing computers speeds and feeds to women's physical appearances is insulting and derogatory. It is also a bit sick to think that your readers find computers sensuous and "incredibly desirable."

I gave you the benefit of the doubt and turned the page. But what greets me on the next page? A picture of Lara Croft with a pull-quote: "I couldn't care less about polygon collision detection. I just want to back her up in a corner and watch her carefully rendered boobs [sic] bounce up and down."

I cannot believe you would print a letter from someone who believes the "true meaning" of a best-selling computer game featuring a strong, powerful female heroine is to ogle an animated, two-dimensional character on a computer screen.

I am disgusted that you find such comments acceptable and appropriate in 1998. I would expect something like this from a magazine such as *Playboy*, but not from a computer magazine.

I find it disturbing that you feel the need to sexualize games and systems—both are simply software or hardware, not people.

Lisa Howe

"It's a bit **sick** to think that your readers find computers **sensuous** and incredibly **desirable**."

Acceleratus Interruptus

Does a videocard plugged into an AGP slot require an IRQ?

David Pollack

***Senior Editor Andrew Sanchez replies:** That depends on the videocard, but for the most part, the answer is yes, an AGP card does use an IRQ. The only videocards that do not require an IRQ are add-in cards such as a 3Dfx Voodoo/Voodoo^2-based architecture.*

Great Balls O' Fire

After reading your great review of the Quantum Fireball ST6.4A drive in *boot* 18, I decided to purchase one. What a great drive! I tested it using Threadmark on the bootDisc, and it boasted a nice 4.68 sustained at a 58% CPU utilization on my Intel 166MMX OC'ed to 225. Then, on a whim, I engaged DMA mode by clicking on the option under the device manager. Imagine my surprise when it managed 4.38 at only 26% CPU utilization. I urge all *boot* readers to try this, if you haven't already.

Patrick Browning

...But AOL *Is* Spam!

I was just reading about AOL's court victories against spammers, and I don't know whether to laugh or puke.

As if it weren't bad enough that we have to put up with AOL's cheesy commercials, it also has the nasty habit of repeatedly sending

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discs out in the mail. I bought a music CD a while back; you'll never guess what was on the CD... yep, AOL software.

If you ask me, AOL is the very definition of spam.

Steve

What Else Is There?

What are 3D accelerators good for except enhancing games? 200-something bucks just doesn't seem reasonable if all these cards do is make games look better and run smoother. What else do they do?

W J Cheng

Senior Editor Andrew Sanchez replies: *Hmmm... in all honestly, that's all the majority of these accelerators do. Unless the videocard supports OpenGL fully and completely via a Win95 Installable Client Driver (ICD) or NT Mini Client Driver (MCD), then you won't get much else out of them. Now, if the videocard in question does have OpenGL-compliant drivers, then you can fire up your favorite 3D rendering program such as* Lightwave 3D *or* 3D Studio Max *and enjoy realtime object previewing via hardware acceleration. This means you'll be able to rotate and manipulate your 3D model in realtime, as opposed to waiting for the screen to redraw the image. Most ICDs out there, with the exception of 3Dlabs' Permedia2 chip, are still in beta development, so expect ICDs to be a bumpy ride.*

"Christ! I've tweaked at my 'underpowered' **P200 with 32MB EDO** to the point where **it boots up in 35 seconds flat**, and shuts down in 1.4 seconds."

Pamela Lee Pirch

Hey, you guys need to work on getting Sarah Pirch's picture posted. Nothing else has inspired me to take such an interest in the Web. Except for the innumerable sites on Pamela Lee, I guess...

Jake Solomon

Managing Editor Sarah Pirch replies: *Send in $29.95 for access to the streaming video.*

Music To Quake By

I love to play my favorite CDs while playing *Quake* (it especially rocks with Nirvana!), but *Quake II* won't let me have any fun. Do you folks know a workaround for this problem?

Mike Dellacava

Software Editor Rick Popko replies: *Alas, you can't play your CDs in single-player mode because of copy-protection reasons. You can, however, do it in multiplayer mode. What you need to do is hit ~ to go into console mode, then type CD[space]play[space], then whatever track number you want to play.*

AGP-Pro

I have a dilemma. I own a Pentium Pro 150 overclocked to 180 and want a chipset that supports AGP and UDMA for the relatively rare Socket 8. The VIA Apollo chipset already supports both for the Socket 7, but have you heard of any renegade chipset manufacturers that are making chipsets that support UDMA and AGP for the Pentium Pro?

Jhason Sinjin Abuan

Senior Editor Andrew Sanchez replies: *Intel currently calls the shots on AGP, and the Pentium Pro was simply not a part of their grand plan. Some readers say they've used a 440LX motherboard with a Pentium Pro daughtercard and have experienced all that 440LX goodness with a regular old Socket 8 Pentium Pro. So, you may want to check out mainboard makers that offer daughtercards, such as Tekram and Tyan.*

Pride And Poise

I just finished reading your review of the G6 333XL in *boot* 20, and I thank you. I work for Gateway on the manufacturing floor and I'm very proud of the work we do. My coworkers and I have always thought our systems were "kick ass" (and not just because we get a discount), but it takes a great magazine like yours to tell the masses.

Corey Werner

I just got *boot* 20, and I'm flabbergasted. The Gateway G6-333XL reviewed on page 72 has the world's fastest Intel processor, 128MB of SDRAM, and the fastest hard drive you can get. And it takes over a minute to boot up? Six seconds to shut down? Christ! I've tweaked at my "underpowered" P200 with 32MB EDO to the point where it boots up in 35 seconds flat and shuts down in 1.4 seconds! Don't these big companies tweak their products before shipping?

Dilbert

Feed The Cheetah

I am lusting after and seriously considering buying a 9GB Seagate Cheetah hard drive for my computer. Two things concern me about the first 10K RPM drive, though: heat and noise. My computer is in my bedroom. Will the Cheetah keep me awake at night with constant cat-like growling? Will I need to worry about keeping the drive cool, and, if so, how do I do it?

Greg Davis

Technical Editor Sean Cleveland replies: *The new second-gen Cheetahs not only run dramatically cooler, but are also faster. Data-rate and seek-time improvements are made possible due to the shrinking of the drive platter itself. Not only does it decrease power consumption (by 25%), it decreases the time it takes the read head to find data. So unlike the first-generation drives, these new ones don't require dedicated cooling. But it never hurts to add a few internal fans to keep a constant airflow through the case. As for the*

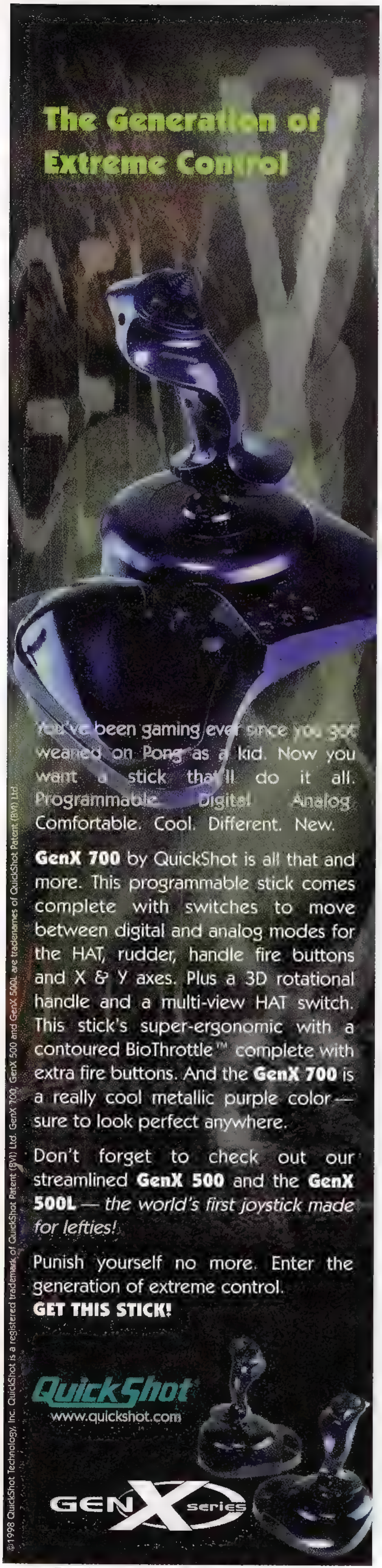
Your Motherboard Rocks.

Your Modem Screams!

Your Drive Is HUMONGOUS!

Your System Crashes.

Product Information Number 122



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Product Information Number 289

COMM PORT

noise, we've had two striped drives running side-by-side and they purr like kittens. We haven't noticed any loud clicks or crunches during data writes, and they don't growl.

The Feel-Good Edition

Just finished reading *boot* 20 and I gotta ask... does T. Liam Mcdonald ever have anything positive to say? It seems every month he's going on about how the game industry is going down the toilet. But he never reflects upon the good things in the gaming world.

It's been said that the industry is dying due to companies releasing unfinished products. Take a look at the original *Quake*. Did its incompleteness put a damper on its success? No way in hell. It's one of the most popular games ever published for the computer.

"Did the original **Quake**'s incompleteness put a damper on its success? **No way in hell.**"

In fact, you can't possibly deny that 1997 was one of the most productive years in gaming in a long while. We saw some of the biggest titles in gaming in years, saw the sequels to others, and so on. And now, we're seeing even more huge titles soon coming, *Quake Trinity* being a biggie. How somebody could possibly think the gaming industry is declining is simply beyond me.

BEElzebUb

Columnist T. Liam McDonald replies: *Great empires rise to their greatest peaks just before they fall, and the decline is usually precipitated by unrestrained growth in the wrong direction. PC gaming has reached amazing heights lately, but it also shows all the signs of something that has simply grown too big too fast. I love PC games, otherwise I wouldn't be doing this. I just think the gaming press needs to stop being cheerleaders long enough to cast a critical eye on the more negative trends.*

McDonald says game companies would do better to release games a few months late than release buggy games that are not technically up to snuff. I disagree. Last year, Sierra claimed *Quest for Glory V* would be coming out in October 1997. Then, a few days before October, they pushed the release date back. This has happened four or five times, and now they say it will be released in September 1998, almost a year after it was originally slated for release.

This is in sharp contrast to *Quake II*, which was released right on time and is undoubtedly the best game out there, even with a few bugs. While I believe in making a quality product, game developers eventually have to publish their games, because the best and most smoothly running game in the world is worthless if I never play it.

Michael Narayan

Gamers are not happy with the way many games turn out, and the complaints are endless. However, I don't see any feasible solutions, because they all require the gaming community to get organized, something that almost never happens to such a diversified group. Maybe some of these ills could be rectified with a broad class-action lawsuit, dealing with consumer fraud and false advertising. Perhaps the lawyers can scare publishers into behaving themselves.

Chang Koo

Driver Confessionals

I would like to respond to a bootNet letter from Jon Seeley, who wrote that, "The biggest problem is getting decent code writers to do the job. Writing nice, tight routines to access hardware should be something to be proud of, not disdained."

I wonder how often Mr. Seeley has had a deadline to meet. Writing "tight" code is something to be proud of, but don't you think the bottom line also has something to do with it? Marketing people jump up and down because a deadline is near while the competition is getting ready to release their "just as good, if not better" product.

The almighty profit dwindles away while you make sure your code is "tight" and "flawless." What about the last-minute design change an engineer failed to include in his specs? Programmers as well as everyone else in the business of providing a product or service are human, and nothing is going to change the flood of patches and updates that come with the release of a new piece of hardware or software.

Adrian Edmundson

You Talk, We Listen and Type Back

Having ventured into the morass that is bootChat these last two sessions, with its jumble of people all banging away at their keyboards each trying to out-shout the other, I've come to the conclusion that the best way to handle the chaos would be for you guys to open up the microphone in bootHeadquarters and transmit from your end over the Imagine Radio player. That way you won't have to fight to get into your own chat room.

Michael DePoorter

Editor in Chief Brad Dosland replies: *If we did that, you'd all learn our dirty little secrets. For example, if you ever heard our news editor Bryan Del Rizzo say "about," you'd know he's Canadian. If you really wanna hear the bootBoyz2Men's velvety tones, tune into the bootCast on Imagine Radio (www.imagineradio.com).*

Easy as N-L-X

What's with the Intel formfactor that's supposed to change the whole damn motherboard landscape? I read something about the NLX motherboard design in your mag a long time ago, but haven't heard anything about it since. What's the scoop? Does NLX really stand for: Not-Likely-to-be-eXecuted?

Sean Hawk

Senior Editor Andrew Sanchez replies: *Heh. NLX is the new formfactor specifically designed for low-sitting desktop units, or "pizza box"–sized cases, as well as arcade machines. For those of you who don't remember, NLX is the modular riser-board motherboard design that allows a quick swap-out of the mainboard for quick upgrades without having to remove your videocards or other subsystems. Videocards and other expansion cards need to have a special expansion slot bracket to fit into an NLX formfactor, as well as a lower profile.*

In terms of actual mainboards, the majority of makers, such as Aopen, FIC, Gigabyte, Soyo, and others, have backed the formfactor, but unless NLX chassis become more widely available, they will most likely stay relegated to arcade boxes and certain OEM boxes. Toshiba's new Equium line of workstations is based on the modular NLX design.

Bump In The Night

What is bump-mapping and how does it makes those Dinos look so damn good in the upcoming game *Trespasser*. I've heard the Voodoo^2 doesn't really support true bump-mapping but can perform the same trick using a different technique. Can you shed some light on this?

Andrew Michael Valderas

3Dfx's Tony Tamasi replies: *Bump maps are stored as bitmaps, and the bump effect is created by using a single bump map and subtracting the same bump map from itself with a small shift. We calculate the bump-map shift value based on the light vector. This is why moving the light around causes the bump-map effect to change. A slightly shifted version of the original image is subtracted from the original image. If the shifting is applied toward the location of the light source, the resulting image displays bumps and dips as if the light source were illuminating the surface. Shifting and subtracting are what simulates the embossing. Subtracting is an operation that can be achieved easily in a system that implements multiple textures per pixel in a single pass with sophisticated texture combine units. Voodoo^2 is such a system.*

We don't use light maps in the donut demo, as some have theorized. The specular and diffuse lighting you see is done with gouraud shading. In the donut demo, we use two bump-map textures (the same texture twice), a base texture map, and an environment map.

11th Planet Will Be A Bugfix

The one question you forgot to ask Bethesda Softworks about *10th Planet* (Previews, *boot* 20) is whether this game will actually be play tested before they ship it, unlike the subpar programs they have released in the past.

Craig H. Fry

Calling Bunk On Internet 2

I think it really sucks hardcore that the new Internet will be used only for universities and research institutions. The majority of us suckers out here that have registered domain names in the last eight years have contributed $30 per domain to that NSA fund for the development of the new Internet, and what do we get? A great online network that will only be used for colleges and research institutions. I want something I can use at home.

Scott Parrish

Diamond in the Rough

I recently purchased Diamond's Monster Sound M-80. When I got the board home and out of the box, lo and behold, a port was missing! That's right, my board has only one output port! And in *boot* 19 (and on the back of the box) it shows the board with two outputs! Is it just my board?

RHONE99

Online Editor Gordon Ung replies: *This is what happens when companies try to capitalize on a hot product name. The card in boot 19's soundcard roundup was the original Monster Sound which had two outputs for a total of four speakers. It was replaced by the Monster Sound M-80, which has only one output for a total of two speakers. Diamond apparently did make a boo boo on the boxshot. It shows the original Monster Sound with two outputs.*

Diamond is the process of changing the photo. Your only option at this point would be to return the card to the store or call Diamond's customer support. We understand the original Monster Sound can still be found on the shelves in some stores.

Intel Not Inside

What does *boot* think of non-Intel chipsets such as the VIA VP3? I'm considering buying the FIC PA-2012 motherboard that has that chipset. Is there anything about that board that I should know about that would not make it bootWorthy?

Aaron Frodsham

Senior Editor Andrew Sanchez replies: *Speak of the devil! Take a gander at our Socket 7 feature on page 49 of this very issue. Frankly, I'm not impressed with the current state of Socket 7 AGP—it's too riddled with quirks and bugs for us to recommend it for power users who want to plug in an AGP 2x card. AGP 1x works fine, but don't blame me if you decide on getting a PowerVR Second Generation or Matrox MGA-G200 and plug it into your VP3, and your rig starts actin' the fool. VIA is promising fixes for its current problems with Intel's i740 chip, but what about everyone else's parts?*

As of now, Intel is the best way to go if you're fiending for AGP lovin'.

The Elusive Dream System

It continues to amaze me how people write letters in about their "dream system" and then want to overclock them. If you wanted to run a P266 at 300MHz, why not buy a 300MHz? Lets look at it a different way: If you go out and by a Ferrari, your dream car, do you take it home and replace the engine? No, you leave it as is because the whole package is put together perfectly. Come on people, if you want a "dream system," set your sights high and get what you want, not something you can tweak to what you want.

Rich Kolar ▮

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ON **THIS MONTH'S** DISC

Video **Driver** Madness Part Deux

Drivers and patches are located in directories of the same name on the root of this month's bootDisc. Read the directions prior to installation. All are uncompressed for your convenience.

Those with a Voodoo^2 can check out the bump-mapping and environment-mapping demo located in the drivers subdirectory as well. Read the DONUT.TXT file for instructions on how to control and tweak it.

COMPANY	VIDEO	BUS	WIN 95 VERSION	WIN NT 4.0 VERSION
3Dfx	Glide Drivers	PCI	2.43	—
	Voodoo^2 Reference Drivers	PCI	2.50	—
ATI	3D Rage Pro	PCI/AGP	5.00 (build 4.10.2312) Turbo	5.0.113
Canopus	Pure3D	PCI	1.50.04	1.20.02
	Total3D 128V	PCI	1.10.10	1.00.04
Diamond	Monster 3D	PCI	1.10	—
	Stealth II S220	PCI	-	4.00.1381.0101h
	Viper V330	PCI	4.10.01.0125	—
		AGP	4.10.01.0125	—
Hercules	Thriller 3D	PCI	0.81.3539	0.63.5083
Jazz Multimedia	Adrenaline 3D	PCI	4.10.01.2071	—
	Outlaw 3D	PCI/AGP	1.1	1.1
Matrox	m3D	PCI	4.1.1.5.002	—
	Millennium II	PCI	3.81.013	3.31
		AGP	3.82.016	3.32.085
Quantum 3D	Obsidian	PCI	Release 3	—
STB	Velocity 128	PCI	1.66	1030
VideoLogic	Apocalypse 3D	PCI	4.11	—

We Got Your Patches, Here!

GAME	PUBLISHER	VERSION
Burnout: Drag Racing	Bethesda	Patch #1
Dungeon Keeper	Bullfrog/Electronic Arts	Direct3D Upgrade 10.1
F1 Racing	Ubisoft	Voodoo & Voodoo Rush Fix
Ultim@te Race Pro	Microprose	1.03
Wing Commander Prophecy	Origin Systems/Electronic Arts	Voodoo/Voodoo^2 Patch
Worms2	Microprose	1.0 to 1.04

QuickTime This month we've included the *QuickTime 3.0* player, two AVIs and one MOV file to demonstrate *QuickTime*'s Sorenson codec. The first clip, 700S.AVI, is the original clip and stands at 14.6MB. Next we compressed the 700S.AVI in Adobe *Premiere* using Cinepak. The resulting file—called BABYCIN2.AVI—was 16.9MB. We then compressed the 700s clip using Apple's Sorenson codec. The resulting file—called BABYSOREN.MOV—was 8.63MB. Judge the picture quality differences for yourself.

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SOFTWARE DEMOS

Burnout *Burnout* is the first real PC drag-racing simulation. Features include 20 different cars and over 60 tweakable components. Uses accurate physics to simulate engines, suspension, tires, and collisions. Includes multiplayer support over modem, LAN, and Internet.

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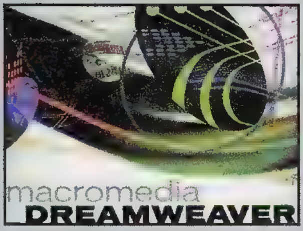
PROFESSIONAL EDITION

CheckIt *CheckIt* provides the tools to help pinpoint and solve computer problems, backup and restore critical system files, install new hardware components, uncover hidden conflicts, and optimize system performance.

DISPLAYMate
VIDEO DISPLAY UTILITIES

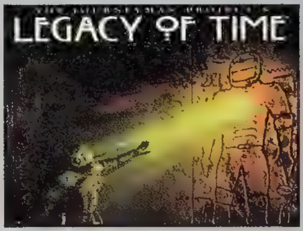
DisplayMate *DisplayMate* for Windows is a video utility for setting up, tuning, testing, and evaluating any computer monitor or video display for optimum image and picture quality. It's designed for both video novices and experts.



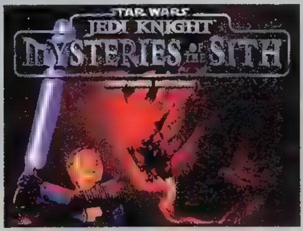
Dreamweaver *Dreamweaver* provides error-free roundtrip HTML between visual mode and your favorite source editor, drag-and-drop table and frame design, and a library feature for managing site-wide changes.

HOMESITE
HTML editing tool

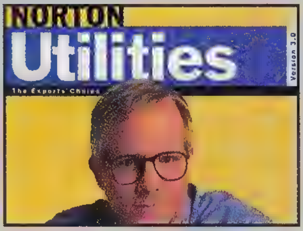
HomeSite Use *HomeSite*'s prebuilt templates to jump-start your web development effort. Create higher quality web pages that let you track and troubleshoot code at a glance with automatic color coding of HTML, CFML, and other scripts. Other features include; spell-check, site-link validation, and the ability to verify HTML using links to A1Soft's CSE 3310 HTML Validator.



Legacy of Time To save the future, you must enter the past. In *The Journeyman Project 3 Legacy of Time*, you play a time traveler who assumes multiple identities, interacts with characters from ancient civilizations, and solves a bunch of puzzles along the way. Gameplay is similar to Activision's *Zork*.



Mysteries of the Sith *Mysteries of the Sith* is an expansion pack for *Jedi Knight*. New features include a new character (Mara Jade); 14 new levels; four new weapons—including a carbonite gun, repeating blaster cannon, and sniper scope; five new Force powers, featuring Force Push, Saber Throw, and Force Projection; over 24 new enemies; and three new multiplayer personalities.



Norton Utilities *Norton Utilities* detects, repairs, and prevents major and minor computer problems, optimizes your computer to run at peak efficiency, detects Windows problems in the background, prevents crashes, and provides basic virus detection and repair.

Outwars Because of clutter and the decay of Earth's natural resources, humans have been forced to colonize other planets. You are a member of the CDF Marine Jump Corps sent in to investigate a disturbance on a new colony. Equipped with a rocket pack, a protective battle suit, and an arsenal of weapons, you're a walking tank. Prepare to do battle with alien creatures à la *Starship Troopers*.

Spec Ops *Spec Ops* is an action-oriented, realtime 3D game based on actual Special Forces operations. Gameplay centers around five multi-staged missions in huge, intensely realistic, outdoor environments. Players will control two Rangers, each with its own uniquely chosen group of weapons.

VANGERS
one for the road

Vangers In *Vangers: Masters of the Road*, you are a modern-day road warrior who must buy/trade vehicles, stock 'em with as much weaponry as you can afford, or opt for other modules that can give you the power of flight or the ability to drive under water. Each vehicle can be customized to suit your style of play, and there are nine worlds of multi-level terrain to explore.

Worms2 *Worms2* is a turn-based game where up to eight players can participate in any given match. You command a platoon of Worms who inhabit a randomly generated terrain, its time to do or die, put up or shut up. You must destroy the other worms with an assortment of devastating weapons.

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128-bit AGP 3D video with 4MB SGRAM
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56Kbps data/fax modem*
104-key enhanced keyboard
Microsoft IntelliMouse, USB connections
Microsoft Windows 95 and MS Plus!
Microsoft Home Essentials
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Cons. lease $99/mo.

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[illegible]

Say Goodbye To AVI

Microsoft has announced two new multimedia file formats that will replace the aging AVI format.

The two formats are Advanced Streaming Format (ASF) and Advanced Authoring Format (AAF). ASF is designed for streaming media distribution, while AAF (which was developed with help from Adobe and others) is for exchanging media among digital production tools and content creation applications.

An SDK should be available in early 1999. ASF 1.0 support will be built into future Windows releases. ASF 2.0 will be available as updates to Windows 98 and NT 5.0 users.

Cyrix Hits 266MHz... Sort Of

With the sole exception of a few token vendors, Cyrix's 6x86MX—recently renamed "M-II"— has met with apprehension, but that isn't stopping National Semiconductor from introducing a faster version of its Socket 7 processor. The 6x86MX PR266—shown for the first time at Cebit in March—will follow the same Cyrix convention of giving you "Performance Ratings" as opposed to actual clock speeds for its CPU nomenclatures. In reality, the 6x86MX-PR266 runs at 208 MHz internally with a 83MHz system-bus speed.

The 6x86MX processor incorporates an enhanced 64K unified cache and a 512K entry branch target buffer (BTB). In addition, the memory management unit (MMU) consists of a two-level translation look-aside buffer (TLB) that is capable of storing up to 384 unique memory block addresses. These features allow the 6x86MX processor to satisfy a higher percentage of memory accesses on-chip, reducing the need to access slower off-chip memory.

The 6x86MX PR266 processor is priced at $180 in quantities of 1,000, less than half the price of a 266MHz Pentium II processor, which is priced at $375. General availability is expected late in the second quarter of this year, provided OEMs actually line up.

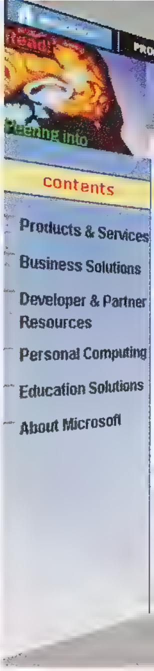
Vendors Plot The End Of Legacy PCs

Your spreadsheet data may not be all that disappears come the year 2000. Microsoft is leading a drive to eliminate "legacy PC" architecture including the ISA bus, COM and LPT ports, CD-ROM drives, and other familiar components.

Microsoft is reportedly talking to numerous hardware and software vendors about forming a "Future PC Architecture Initiative" based on the PC 99 specification currently in development (by Microsoft and Intel).

The spec's hardware goals include assigning system resources and devices independently from buses, independent event scheduling, and eliminating BIOS dependencies. Parallel and serial connectors would be replaced by USB and IEEE 1394 ports, with DVD-ROM drives replacing CD-ROM drives. Software emulation would replace ISA buses and other I/O hardware.

The final version of PC 99 is due out by the end of this year. Hardware makers will have until the year 2000 to comply with the spec and earn the "PC 99-compliant" certification. **b**



Microsoft Unveils **Chrome**

HAPPY, **SHINY TECHNOLOGY** PROMISES TO **CHANGE THE FACE** OF THE WEB

After nearly two years in development, Microsoft has unveiled Chrome, a new series of multimedia system extensions that will employ aggressive compression schemes to shift the burden of online multimedia from the net back to your PC.

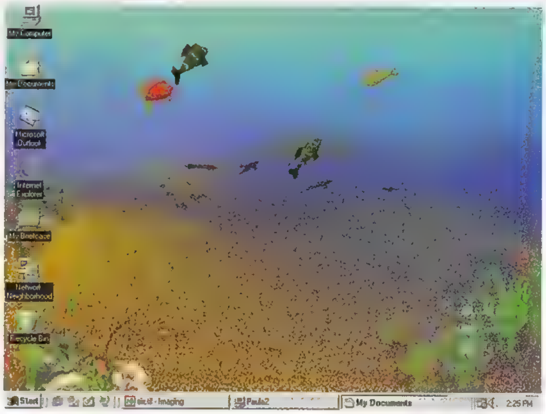
According to Microsoft's Eric Engstrom, one of the technology's architects, "Chrome will ship with an enormous library of interactive 3D data types enabling web designers to create multimedia-rich web pages that download in a fraction of the time it takes standard JPEGs or GIF animations."

These plug-ins—essentially a series of XML tags which tap the power of DirectX—will be offered to OEMs in the first quarter of 1999, but inside sources told *boot* that development is actually ahead of schedule and Microsoft may ship before the end of this year.

But there's a hitch.

The only way to get the Chrome technology (and the Chrome-enabled version of *Internet Explorer*) is to purchase a new high-end PC running Windows 98. System manufacturers will have to pay Microsoft a nominal fee to include the premium. *If* the technology becomes widely adopted, Chrome will likely become a standard component of the operating system, including future revisions of Windows 98 and Windows NT.

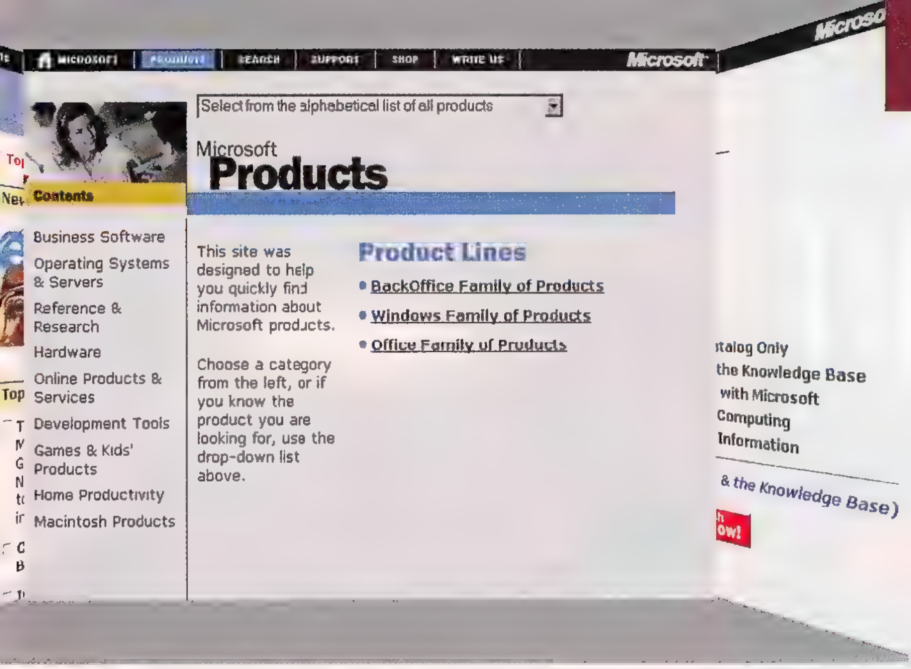
To tackle the bandwidth and latency limitations of the Internet, Chrome has been designed to shift a larger burden of computation onto the CPU, a novel approach since computing power increases much more rapidly than web bandwidth. As a result, its steep system requirements—350MHz+ P-II processor, 64MB of RAM, DVD-ROM, and a 3D-capable AGP graphics card—plays into the ambitious plans of Intel, which will help promote Chrome-specific content, if only to justify the sales of its newest, fastest processors. However, Intel's support isn't just from an evangelical perspective. A lot of the plug-ins shipping with Chrome—including the shattering effects, ripples, and waves—are actually Intel coded.



If this was your desktop, these fish would actually be swimming.

However, Chrome leverages its steep hardware requirements by handling its rich content—including the plugs-ins, 3D models, and scripting functionality—on the local PC, minimizing the need to send information over the Internet. And since the client does all the work, it'll take less time to download a Chrome-enhanced page than it would a typical text-and-bitmap-based web page, even with more complex effects and animations.

With Chrome, designers will be able to incorporate impressive elements into their HTML by simply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Chrome will let you view 2D pages mapped onto a 3D grid.

dragging-and-dropping Chrome components. Built-in 3D effects such as shattering, spinning, shrinking, scrolling, lighting, texture mapping, and other types of animation can be added simply by selecting stock 2D objects and applying the effects. The modified HTML pages can then be saved by Chrome and reused. By allowing them to be converted to 3D texture maps while remaining fully interactive, web pages can be organized, viewed, and manipulated in ways that aren't possible using the traditional 2D paradigm. "Having Chrome integrated into the browser environment is a good thing," says nVidia's David Kirk, "because it allows local DirectX computation without a lot of bandwidth overhead."

And the size of elements doesn't matter either. Since Chrome-generated 3D models, data types, and texture maps can be much smaller in size than traditional JPEGs, MPEGs, or animated GIFs, web designers working with Chrome can make their images as big as they want without worrying about lengthy download times. The vector information, lighting instructions, and 3D data remain the same size regardless of how big the image or how complex the animation is. At a recent developer's conference, Microsoft demonstrated several animated GIFs that were re-authored for Chrome and all the images remained virtually indistinguishable, while achieving up to a 10x compression increase.

> "Chrome will **dramatically** transform the way the web is viewed, and will be a huge advantage to Microsoft in it's endless effort to **dominate the net**."
>
> —Alex St. John

In addition to being compatible with conventional multimedia authoring techniques, the Chrome system extensions will also serve as their own authoring environment. The Chrome authoring tool will allow web designers to easily, and graphically, add 3D animation and interactivity to new and existing HTML code.

While radically different from VRML, Chrome represents a significant challenge for the interactive 3D graphics standard on the web. As it stands, VRML objects can be placed into a Chrome web page, but not vice versa. Now VRML proponents are concerned that Chrome may spell an end to their standard and are hoping to convince Microsoft to merge the two technologies, an unlikely scenario at best.

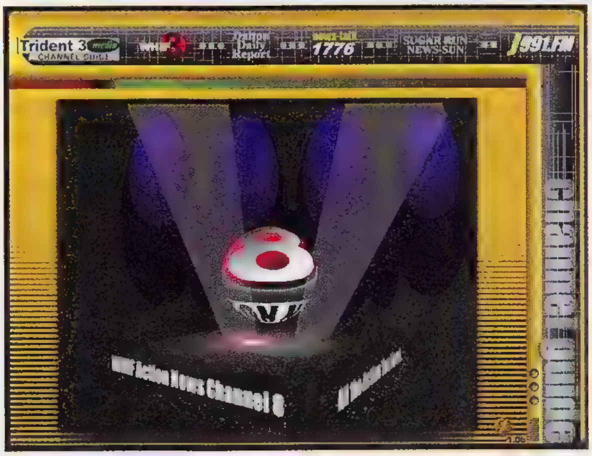
"With fast PCs and 3D accelerators, there is an enormous capability to do complex animations locally," muses Kirk. "Unfortunately, VRML is not optimized to do this very well, and for high performance applications, it's kind of broken."

Given that 3D interactivity, authoring, and browsing are all fully integrated in the same product, it is much easier to imagine widespread support for Chrome, rather than for VRML, a basic scripting language.

But Chrome isn't just for the web. One of the other compelling things Microsoft is planning—but hasn't publicly talked about yet—are remappable user interfaces that are independent of the application's functionality. For example, you could add 3D effects to your *Word* interface or download a new more efficient UI. It's a radical new idea for the desktop, which Microsoft clearly believes can be richer and more interactive than ever before.

According to Alex St. John—*boot* columnist and former Microsoft employee—Chrome unmasks Microsoft's grander plan to introduce advanced multimedia technology to the Internet and dramatically leapfrog other browsers. "Over time, Chrome will probably evolve to become the new UI model for desktop computing," says St. John. "If Chrome authoring is widely adopted, it will mean a dramatic transformation in the way the web is viewed, as well as a huge advantage for Microsoft in its ongoing effort to dominate the net."

Of course, the success of any standard depends on adoption, and no one knows just how much or how compelling the actual Chrome content will be. Most developers and designers allocate their limited resources based on installed base, which represents a chicken-or-egg dilemma for a new technology such as Chrome, which starts at zero. Still, with the big names of Microsoft and Intel behind it, this capable technology could revolutionize the web once turned loose into the hands of millions of intelligent, creative web designers. ▯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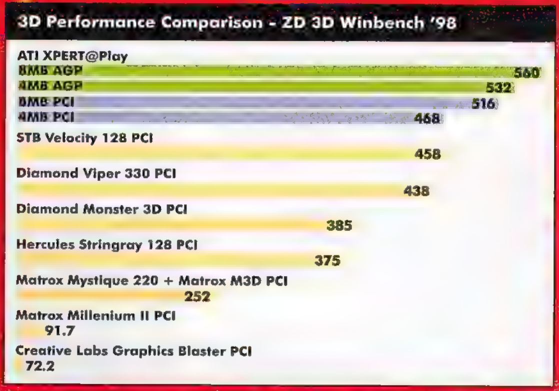

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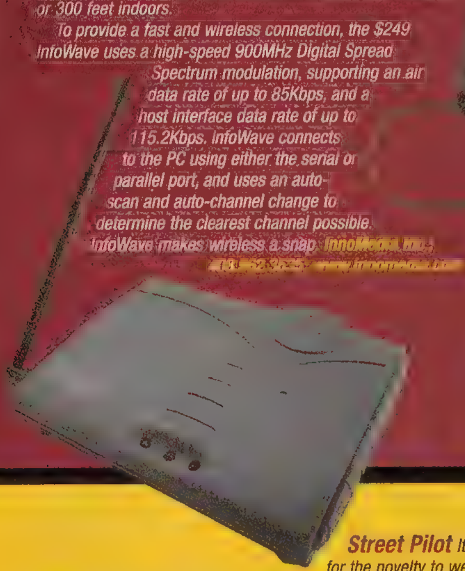


InfoWave Cables blow. No matter how hard you try to bury 'em or hide 'em behind your desk, they have a habit of snaking out, lying in wait to trip you the minute you walk by with a cup of hot java in your hand. Enter InfoWave, a wireless computer connection that'll connect you and your PC to other remote peripherals up to 800 feet away outside or 300 feet indoors.

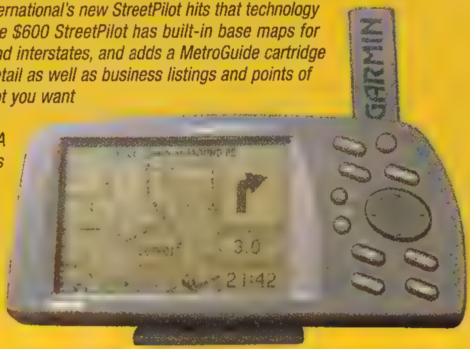
To provide a fast and wireless connection, the $249 InfoWave uses a high-speed 900MHz Digital Spread Spectrum modulation, supporting an air data rate of up to 85Kbps, and a host interface data rate of up to 115.2Kbps. InfoWave connects to the PC using either the serial or parallel port, and uses an auto-scan and auto-channel change to determine the clearest channel possible. InfoWave makes wireless a snap. **InnoMedia Inc.; [illegible].562.3625; www.innomedia.com**

DVD-L10 OK, we all know DVD software isn't exactly taking the world by storm, but much to the chagrin of Laserdisc owners, DVD movies are available in droves. And boy, what better way to watch DVD movies than with Panasonic's newest "must-have" gadget—a portable DVD-ROM player?

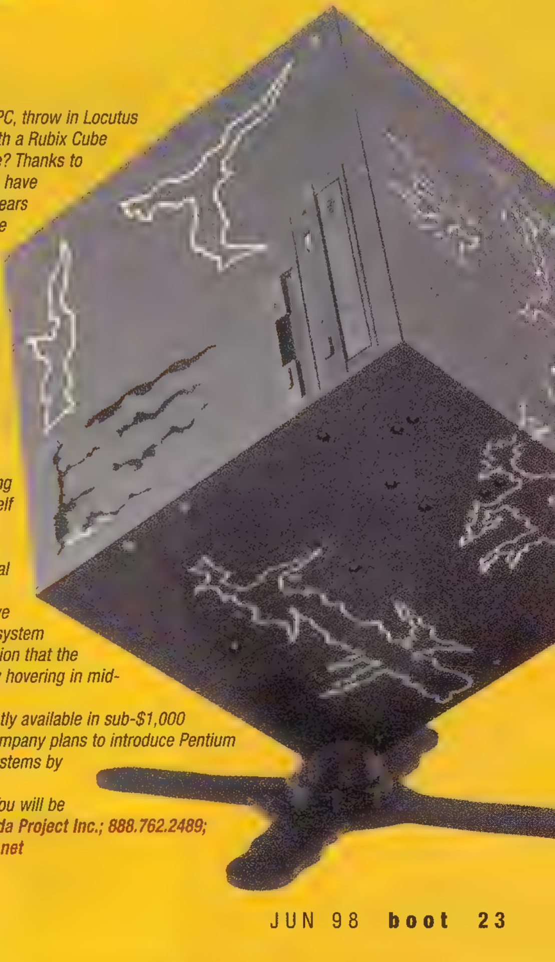
The $1,249 DVD-L10 features a 5.8-inch wide LCD display, but the aspect ratio can be adjusted to accommodate either a standard 4:3 TV dimension or a widescreen 16:9 DVD dimension. There's even a built-in 10-bit video DAC (which helps minimize digital artifacting) and a 96kHz, 24-bit DAC for superior audio playback. Other audio features include dual front-firing stereo speakers, a headphone jack, and Panasonic's proprietary Virtual Surround Sound technology (which simulates the Dolby Digital experience). A graphical on-screen menu, multiple video outputs, wireless remote control, and tri-powered options (AC, DC, battery), round out its manly features.

Oh and hey... it weighs less than two pounds, too.

Panasonic; 800.211.7262; www.panasonic.com



Street Pilot It takes about 15 minutes for the novelty to wear off of having a Global Positioning System unit tethered to a notebook on road trips. After that, it's like passing bad fruitcake around at Christmas as passengers try to pawn the clunky combo around. Garmin International's new StreetPilot hits that technology nail right on the head. The $600 StreetPilot has built-in base maps for major roads, highways, and interstates, and adds a MetroGuide cartridge that shows street-level detail as well as business listings and points of interest. Tell the StreetPilot you want to go to an ATM and it shows you the way. Six AA batteries get you 16 hours of runtime. Individual MetroGuide cartridges will be available for major metropolitan areas for $99 to $199. **Garmin International; 913.397.8200; www.garmin.com**

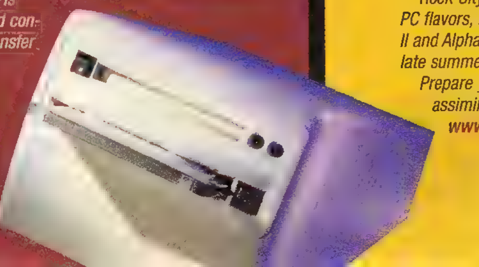


Rock City Take a PC, throw in Locutus of Borg, and mix it with a Rubix Cube and what do you have? Thanks to the Panda Project you have Rock City, a PC that bears a striking resemblance to, well, nothing we've ever seen before.

Rock City is constructed from aircraft-grade aluminum plate, anodized in such colors as cobalt blue or black mamba, and is etched with an interconnected lightning motif. The chassis itself measures only 10.5-inches square, (60% smaller than traditional desktop PCs) and is housed on a distinctive "on point" mounting system that provides the illusion that the entire case is actually hovering in mid-air. Too cool.

Rock City is currently available in sub-$1,000 PC flavors, but the company plans to introduce Pentium II and Alpha-based systems by late summer.

Prepare yourself. You will be assimilated. **Panda Project Inc.; 888.762.2489; www.rockcity.net**



CameraConnect Notebooks have PC card slots. Desktop PCs don't, which presents a problem if you're looking for an easy way to connect to your local network or have a couple of images you want to quickly offload from your digital camera.

Enter CameraConnect, a $149, two-slot, external PC card reader that connects to any old desktop PC. Slot 1 accommodates standard Type 1 or Type 2 PC cards, with Slot 2 reserved for cards of the flash variety. And since the cards can be hot-swapped, you don't have to waste time powering down your machine. Hallelujah! AC power isn't required since all the juice is pumped through the parallel and keyboard connectors, and you'll even achieve faster transfer rates than your serial port can handle.

It's simple. It's elegant. It's cool.

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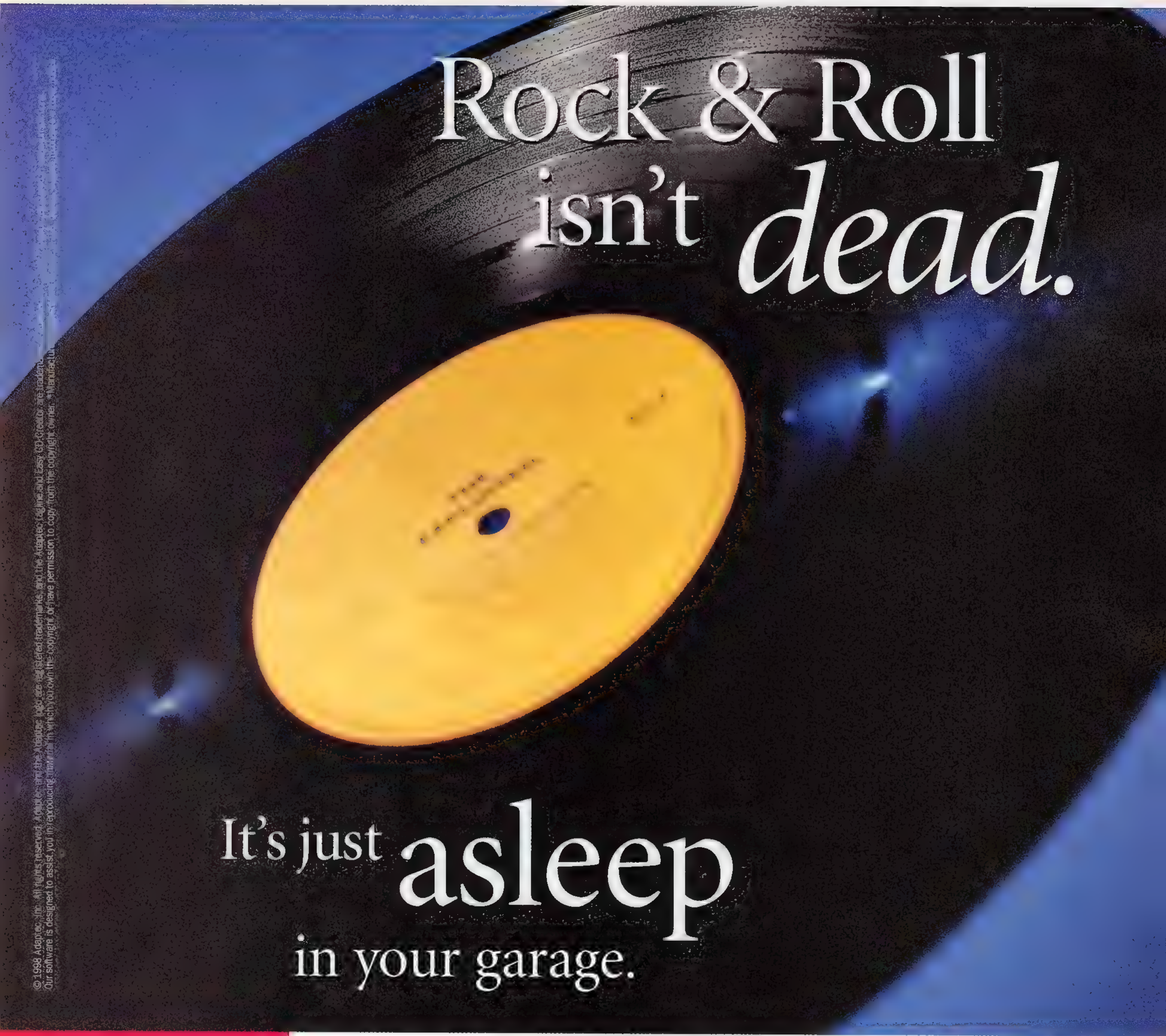

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MEET THE **INSPIRATION** BEHIND DIRECTOS: THE **AMIGA OS**

I received a flood of e-mail from readers about how my proposed DirectOS resembles the Amiga OS, and it all made me wax nostalgic about my first experiences with personal computers.

My first computer was a Commodore Vic-20. I used to buy the Commodore magazines and copy the Basic code for games into its 4K of RAM, then run them on my 1MHz 6502. Of course, I was a Geek Lord even then. My 24K RAM expansion cartridge blew away all my friends' machines.

My next computer was a Commodore 64. Those games were the best, not only because they were state-of-the-art but because when a game got boring, you could challenge yourself by trying to copy it. Commodore's copy protection was as varied and creative as the games themselves. All my friends would bring over their C-64s, we'd order pizza, and spend the evening cracking games.

I was a dumb kid then, and now I realize hacking probably didn't contribute much to the platform's longevity.

I used to write all my games with an amazing development tool called White Lightning. Aside from its sheer cleverness, it did something truly amazing. It wrote realtime programs with semantics for describing concurrent processes.

I had no idea how good I had it then.

There was no OS between my application and the computer, just some support libraries. The development environment supplied my realtime kernel. I ran the interpreted version for debugging, then compiled my code for performance. I thought it would take me forever to wade through the manual's 160-odd pages of red text (tinted so photocopiers of the time couldn't duplicate them) to learn the language, but after slightly over a week of arduous study and experimentation, I was up and coding.

When the **Mac had 128K of memory** and a monochrome screen, the Amiga supported 4,096 colors, speech synthesis, eight channels of 8-bit audio mixing, and 512K of RAM.

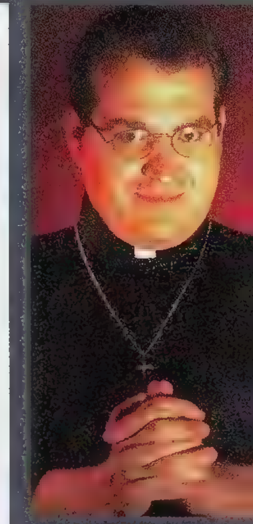
When I was 16, I hauled bags of grain on my back at my uncle's warehouse in order to earn a thousand bucks to buy myself a Commodore 128. I spent the entire summer sweating in the sun and dreaming about that stupid machine.

Finally, the first Commodore Amiga arrived in town, and we all rushed to play with it. At a time when the Mac was still a little brown box with 128K of memory and a monochrome screen, the Amiga supported 4,096 colors, speech synthesis, eight channels of 8-bit audio mixing, and a whopping 512K of RAM. I think the CPU ran at the hair-parting speed of 8MHz. The interesting thing is it's been so long that I can't recall if these were the real specs, or just adolescent fantasies. In any case, we all wanted it desperately, but at $2,000, owning one was only a dream.

It seemed obvious to us that Commodore ruled and always would. How could anybody compete with a platform so technologically advanced? There was always an ongoing debate with our friends in the Atari camp about which was the superior game platform, but the Amiga ended those feuds decisively.

It was a beautiful machine. It supported realtime preemptive multitasking, a great idea that still hasn't been "rediscovered". It had dozens of specialized multimedia chips that all operated concurrently and asynchronously, so the main CPU's primary job was simply to hand out work to all the other processors. It was like a mini-asymmetrical supercomputer. Even the Commodore floppy drive had its own CPU to carry out efficient seeking and caching of information.

To earn money for more computers, I got a job at a local bank. Within months, I'd become their MIS guy. Of course I knew how to use PCs, but they were dull, practical machines, poorly suited for anything but word processing. Two tones of green and plaintive beeping was the extent of their multimedia capabilities. Amiga joysticks were all digital, but the PC and the Mac used analog joysticks requiring timing the decay of a potentiometer to estimate the sticks position and constant calibration. A stupid idea that persists to this day.



ALEX ST. JOHN From his position as Microsoft's game technology evangelist, Alex St. John was responsible for the controversial DirectX APIs that have either taken PC gaming to the next level or were horribly broken, depending on your point of view.

The early PCs were so primitive that Amigas could emulate them and run DOS programs as background tasks. They would have emulated Macs as well, if Apple had not heavily protected its proprietary ROMs. By the time the first clunky, 8-bit, jumper-laden Ad-Lib and Creative soundcards were entering the market, the Amiga had video capture, authoring, compression, playback, 3D rasterizers, and hardware acceleration.

Nonetheless, Commodore died. And we all hated IBM for foisting such horribly designed computers onto us. The Justice Department pursued IBM over "monopolistic practices" (sound familiar?), and we all hoped IBM's hegemony would end before Commodore was erased altogether. Sadly, computer evolution is driven by the needs of large corporations, not technology-loving kids. To this day, multimedia on the PC is still a cobbled-together, poorly integrated afterthought.

The Amiga is one of the saddest examples of superior technology failing in the marketplace, despite having every advantage. Yes, you're all correct. DirectOS and indeed many of the ideas in DirectX were borrowed from the Amiga. It was simply the right idea. In fact, the highest compliment a game developer ever paid me was that DirectX "almost" made the PC as good as an Amiga.

It was a lie, but I was very touched. ▮

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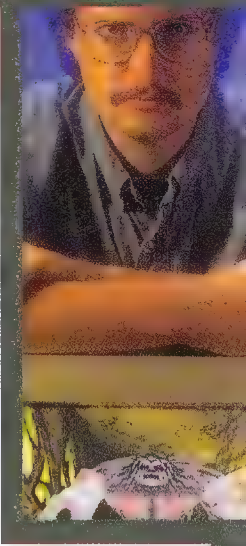
GAME THEORY

WITH T. LIAM McDONALD

Professional **Gamers** or **Lamers**?

THE **RIGHT IDEA** FROM THE **WRONG PEOPLE**



T. LIAM MCDONALD is the all-knowing god of gaming. His mother still can't believe that he plays games for a living.

On the surface, the notion of a pro computer game circuit seems absurd. Come to think of it, it seems absurd below the surface too. That's because, of course, it is absurd.

Before you scoff, let's surf an imaginary weekend of ESPN2, home of freak sports. We have thumb wrestling, ice fishing, snocross, skiboarding, skysurfing, bungee jumping, wakeboarding, extreme adventure racing, and barefoot waterski jumping. These are all *real* competitive events.

While we're at it, the most sacrosanct sporting event in the world, the Olympics, rivets our attention with such nail-biting competitions as synchronized swimming, curling, and this year's winter expo event: ski dancing. What about pool, bowling, darts, racing (car and horse), bocci, tiddlywinks, jacks, hopscotch, and Twister? What about golf? At least that's a sport.

The point is: If fat men pulling fish out of the water is a sport, if water-logged Busby Berkeley routines are a sport, if jumping off a bridge with a big elastic tied around your ankles is a sport, then certainly something like computer gaming can be considered, if not a sport, at least a competitive event. My problem isn't with the idea of competitive gaming. I suggested *PC Gamer* host a similar event years ago to help launch the magazine. My problem is with the way the Professional Gaming League (sorry... the "AMD" Professional Gamers League) sprang into reality.

The PGL's charter rules **explicitly forbid** employees or contractors of the PGL from **competing**, which makes Thresh's participation an **open and shut case**.

Before we begin to think this is some grass-roots upsurge of competitive interest by the gamers themselves, let's remember that this began as a last ditch ploy to save an online gaming service that was hemorrhaging cash. TEN (the "Terribly Expensive Network") was all over the map on pricing and generally getting its ass kicked by the superior (and free) MPlayer. The PGL is just another product of TEN, albeit one with outside sponsorship. TEN has yet to log a year of profits, and it's constantly returning to the venture capital well for more cash.

In other words, it's the right idea by the wrong people.

I don't doubt that there may be $2 million in sponsorship kicking around, since companies with more cash than sense are always willing to sink dough into an idea that may be the Next Big Thing. (Hell, Pearson spent an absurd $500 million on Mindscape and sold it for $150 million.)

With $250,000 in prizes up for grabs, it's no surprise that TEN is currently claiming about 1,500 participants. *Quake II* singles play has a cash purse of $7,000 for first, $4,000 for second, and $2,500 for third, with hardware for each. Team winnings for the top three slots are $14,000, $8,000, and $5,000. That's hefty dough for something you do for free.

Matters are complicated by the fact that the top-seeded *Quake* player's company, Gamers Extreme, helps run the show. No one can deny the natural ability of Dennis "Thresh" Fong to twitch his mouse, or that his past victories earn him a seat at the table. But there are problems.

First, Thresh was given a free place in the roster without going through qualifications, because no one would play him. Second, the PGL's charter rules explicitly forbid employees or contractors of the PGL from competing, which makes Thresh's participation an open and shut case. Either he's out, or the integrity of the competition is compromised.

There are two choices: the rule needs to be removed or Thresh needs to be excluded. Otherwise, PGL is simply a sham. Fong should not necessarily be excluded from playing, but he shouldn't be given a free pass on the rules all the rest of us have to follow.

By the PGL's rules, I would be turned away because I do contract work for one of the sponsors. Yet Thresh's people control the game and he can play?

The PGL is buffeted against many of these complaints by an all-star roster of board members that includes Nolan Bushnell, Peter Molyneux, Brett Sperry, and Scott Miller. This lends legitimacy to the proceedings, but one can't get away from the fact that this is a marketing creation of TEN to boost the profile of its online service, not a *truly* independent league of pro gamers. It will always be tied to the fates and whims of an online service that has yet to drag itself out of the red. The World Wrestling Federation is more legitimate.

There is competition in every game and sport in the world. Chess, Go, checkers, Monopoly, Scrabble, and Magic: The Gathering all have sponsored competitive play and global ranking. However, when a press release crosses my desk from TEN touting pasty-faced basement-dwellers as "athletes," or when we begin to talk about these people as "celebrities," I feel my bile begin to rise. Gamers are competitive, and they gather to compete with or without the help of TEN and the PGL. The worst thing that could happen would be if the PGL became some sort Olympic Committee–style organizing and legitimizing body, setting down rules for competition and controlling ranking systems.

We shouldn't scoff at the notion of computer game competition, but neither should we relinquish control of competition in our hobby to a third party with ulterior motives. ▮

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MACROMEDIA MIGHT **SURVIVE**

After I railed on *Shockwave* in issue 07 of *boot*, I got a call from Macromedia PR suggesting I meet with the then-floundering company's CTO, Norm Meyrowitz. Stock had plummeted from its high of 53 in 1996 to a miserable 8.5, and it seemed obvious that Macromedia was clueless about the next generation of multimedia: the web.

But I didn't get to meet Norm until last year's Spring Internet World.

That's when I got my first glimpse of *Flash*, the vector-based animation tool earning accolades industry-wide. Snappy product managers demonstrated the ultra-quick loading capabilities and "way cool" graphical scaling, and the crowd (of mostly *Director* users) roared that *Director* might finally come to the Internet in a bandwidth-friendly manner.

This all looked good and fine, but I remained skeptical.

There was no actual shipping product, and it seemed a small bone to toss in light of all the Internet-related products the company *should* have been working on. Not to mention that Macromedia was being hit with two lawsuits from investors accusing executives of misleading stockholders and skimming nearly $9 million in fraudulent sales of inflated stock.

Flash eventually materialized, and I was impressed. Designers could actually use their design skills to produce interesting, if not entirely captivating, animations quickly and easily. And no programming! Then *Flash 2* added synchronized sound and the ability to import *FreeHand*. Essentially *Flash* had become what DHTML wanted to be, without all the programming hassles. And designers could now create for both the Mac and PC at once.

> When an accomplished associate of mine spilled the beans about **Macromedia's secret DHTML editor**, I started to rethink my opinions of the company.

But it wasn't until late summer, when an accomplished associate of mine spilled the beans about Macromedia's secret DHTML editor, that I started to rethink my opinions of the company. She was a web designer on the much-touted advisory board of "real users" the company referred to time and time again.

And so it goes, the company has launched *Dreamweaver*, the first visual web page design tool "geared for professional Web developers."

It's true. It's a simple tool, easily extensible, outputting clean useable code (unlike editors I mentioned in my "No Wimpy WYSIWYG" column in *boot* 16). It's an excellent product that should only improve with new versions.

Lo and behold, the stock started its long climb upwards, to 10.5 in November.

Macromedia not only caught on, but actually darted toward the obsessive with its migration to the web. Robert Burgess, president and CEO of Macromedia, went so far as to boast, "We are making solid progress as we transform Macromedia to a Web-centric company," in the company's quarterly results published in January 1998. In this paper the company also boasted several top awards, not surprisingly all are around its Internet-based products. *Flash2* won *Publish* magazine's 1997 Impact award, and *Dreamweaver* took Best of Show at Winter '97 Internet World in New York. (As it well should have!)

Not only did the company nearly replace its CD-ROM focus with web page products, it also changed its core management team and target platform.

Last summer Macromedia hired a new vice president of marketing (Steve King from Lotus), a new vice president of revenue (Brian Allum from Silicon Graphics), and a new vice president of product marketing for the Internet and multimedia authoring (Steve Guttman from Fractal Design). The company is also reassessing platforms, shifting from a Macintosh focus to a more balanced Mac/PC focus. Last year showed 42% of software sales were for the PC, and this figure steadily climbs as Mac sales continue to dwindle.

SHEL KIMEN no longer drinks coffee and can be reached at kimen@klever.org.

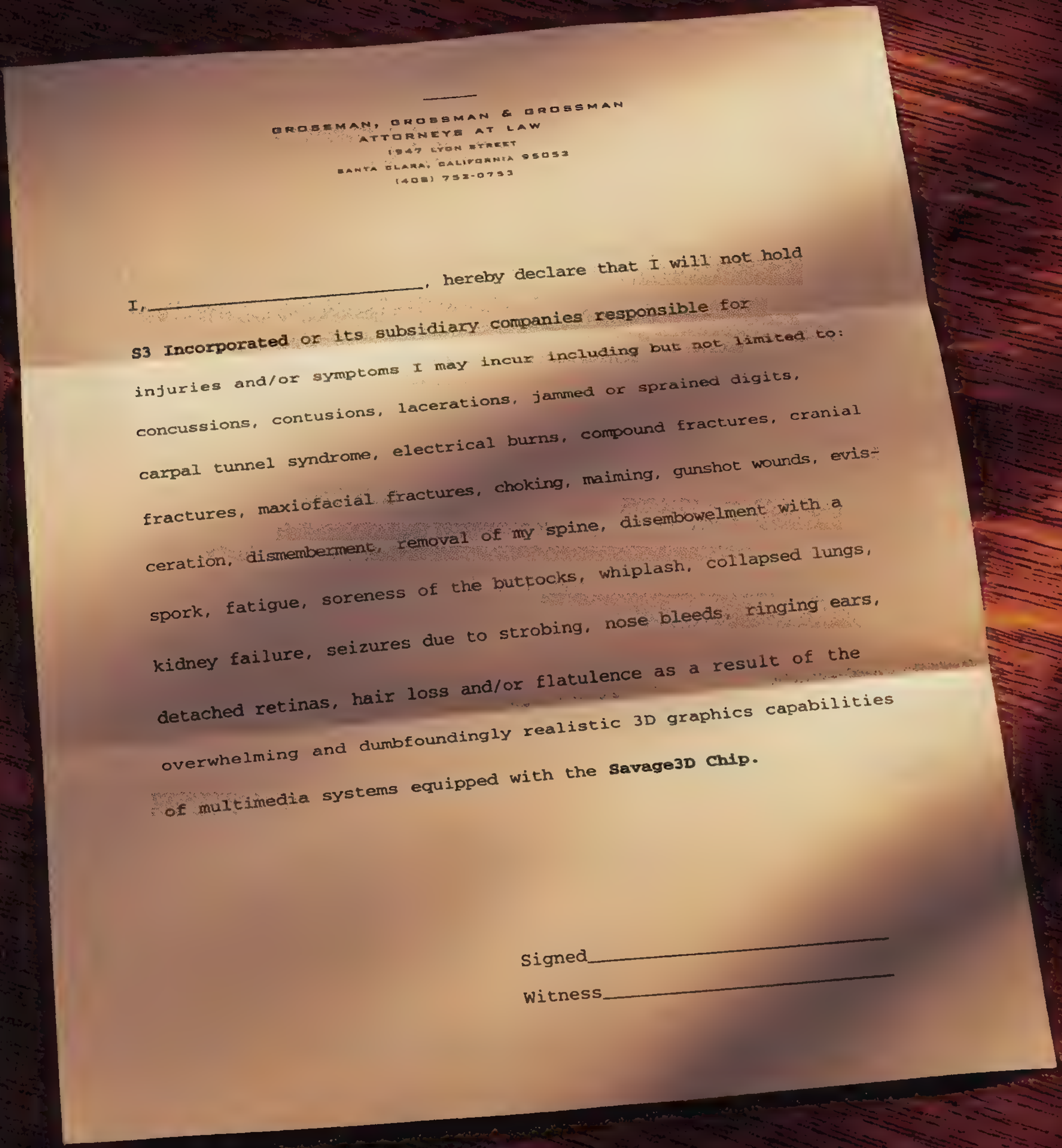
Then come the fireworks.

Fireworks, an all-in-one image-editing tool, claims to be the first "production tool to provide a unified environment for creating, optimizing, and producing high-quality graphics on the web." From the looks of it, this may be so.

Fireworks empowers designers, especially those accustomed to working with print media. It offers standardized icons and interface, as well as common features such as layering and a multitude of special effects. Because it was built from the ground up with the web in mind, and supervised by a real-world-user advisory board, it takes into consideration all those annoying glitches, such as web-safe color palates and the need for multiple software programs, that make web image-processing annoying.

Perhaps its most endearing feature is "live effects," which is, in my opinion, the most time-efficient piece of the package. If you have drop shadows or a snazzy glow on your image of a snowboard and decide you want to make the snowboard bigger, with a program like *Photoshop* (God rest its soul) you'd have to re-create not only the image, but all its effects. With *Fireworks*, when you modify the size or shape of an image, the effects also modify proportionately. If the object changes, so do the effects, and that is wicked cool.

While it may take awhile for Macromedia's stock to climb back up to 56 (sighted at 12.2 in March), I have more confidence than ever that it will succeed. If the web fulfills its promise, so will Macromedia. Good job Norm, et al—excellent comeback! **b**



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WITH TOM HALFHILL

The Fine Art of **Benchmarketing**

SOMETIMES **NUMBERS** DON'T TELL THE **ENTIRE STORY**

Mark Twain once said "There are lies, damn lies, and statistics." Lately, that's been amended for the digital age: "There are lies, damn lies, and benchmarks."

Am I a hypocrite? Don't I write for computer magazines that trumpet benchmark results? Guilty as charged. But before you sentence me to ten years of hard labor on the tech-support phones at Microsoft, hear my appeal.

Apparently, quite a few *boot* readers are upset about Apple's TV commercials that show a snail languorously crawling across the screen with a Pentium II on its back. The narrator brags that the G3-series PowerPC chips in Apple's latest Macintoshes are up to twice as fast.

But it's not as bad as it seems. Recently, *boot*'s sister magazine *MacAddict* tested one of those Macs against a 333MHz Pentium II system. To the editors' surprise and chagrin, the P-II won.

Does that mean Apple is lying? Not quite. It's just clever *benchmarketing.*

One of the foundations for Apple's claims is the BYTEmark, the official benchmark of *Byte Magazine.* It's no secret that my day job is at *Byte.* Although I don't work in the Byte Lab and rarely get involved in benchmarking, I write a lot about microprocessors and can shed some light on this.

BYTEmarks don't measure overall system performance. They are CPU-intensive synthetic benchmarks. That means they test CPU performance, not system performance, and they aren't *real* applications. The algorithms do reflect the kind of code found in modern applications, but the BYTEmark programs themselves are not real applications. They don't test graphics performance, disk I/O, system I/O, or memory speed.

> Listen closely to **Apple's TV commercial:** It does not claim the G3-series Macs are **faster than Pentium II** systems. It says the **chips** in the G3 Macs are "up to twice as fast."

Most of the bootMark programs on the bootDisc are also synthetic benchmarks. However, they do a more complete job of measuring total system performance than the BYTEmarks. And the *Quake, Forsaken,* DeBabelizer, and Visual C++ tests are true application-level benchmarks that exercise the whole system, just as a real application does, because it *is* a real application.

Does that mean the BYTEmarks suck? Not if you interpret the results correctly. If a CPU benchmark says chip A is twice as fast as chip B, but a system-level benchmark says that system B is nevertheless faster than system A, you have got strong evidence something in system A is bogging down the faster CPU.

That's what I suspect happened to *MacAddict.* The *Photoshop* test revealed that the Mac system was slower at running certain *Photoshop* functions than the Pentium II system, even though the Mac has a faster processor. Ideally, the next step would be to run additional tests to see if the Mac's weakness is the graphics card, the hard drive, the system bus, the main memory, or some combination of those things. Heck, it might even be a difference between the Windows and Mac versions of *Photoshop.* The Windows version contains some MMX optimizations, and it's possible the Mac version is not as highly optimized. It's also possible that another test using different *Photoshop* operations would yield different results.

Listen closely to Apple's TV commercial: It does *not* claim the G3-series Macs are faster than Pentium II systems. It says the *chips* in the G3 Macs are "up to twice as fast." According to the BYTEmarks, a 266MHz PowerPC 750 is indeed twice as fast as a 300-MHz Pentium II for integer operations. (It's only a little faster for floating-point operations.) But that *doesn't* mean G3 systems are faster.

In fact, *Byte* ran some *Photoshop* tests just as *MacAddict* did, and obtained similar results. The Pentium II system beat the Mac on operations, such as arbitrary rotations and RGB-to-CMYK conversions—even though the Mac's CPU is faster. Obviously, the Mac is wasting cycles somewhere and Apple hopes you won't notice.

TOM HALFHILL is a senior editor at *Byte* magazine and the author of two computing books. He first became interested in computers during the disco era.

But why is the G3 faster than a Pentium II?

Although Intel's done a remarkable job of keeping x86 competitive, there's no getting around the fact that the x86 is a 1970s CPU architecture. Its variable-length instruction format, inadequate register set, and microcoded instructions put the x86 at a disadvantage against the PowerPC, a modern RISC architecture designed in the 1990s. That Intel manages to keep the x86 near the head of the pack is a testament to the company's vast resources and engineering talent. I can't wait to see what those same engineers do with a completely new architecture like IA-64.

Keep in mind that some tests show a smaller difference between the Pentium II and the PowerPC than the BYTEmarks do. One factor is the compilers. Be very cautious when comparing benchmarks across different CPU architectures. You have to build the executables with different compilers, and all compilers aren't equal. *Byte* uses a Motorola compiler for the PowerPC and a Watcom compiler for the x86. If you don't like those choices, you can download the C source code for the BYTEmarks and compile it with any tools you want.

Benchmarketing might be the world's second-oldest profession. Cain probably told Abel, "I bet I can run faster than you," then stuck a thorn in Abel's sandal. But if you partake of the tree of knowledge, thou shalt fear no evil nor Apple propaganda. b

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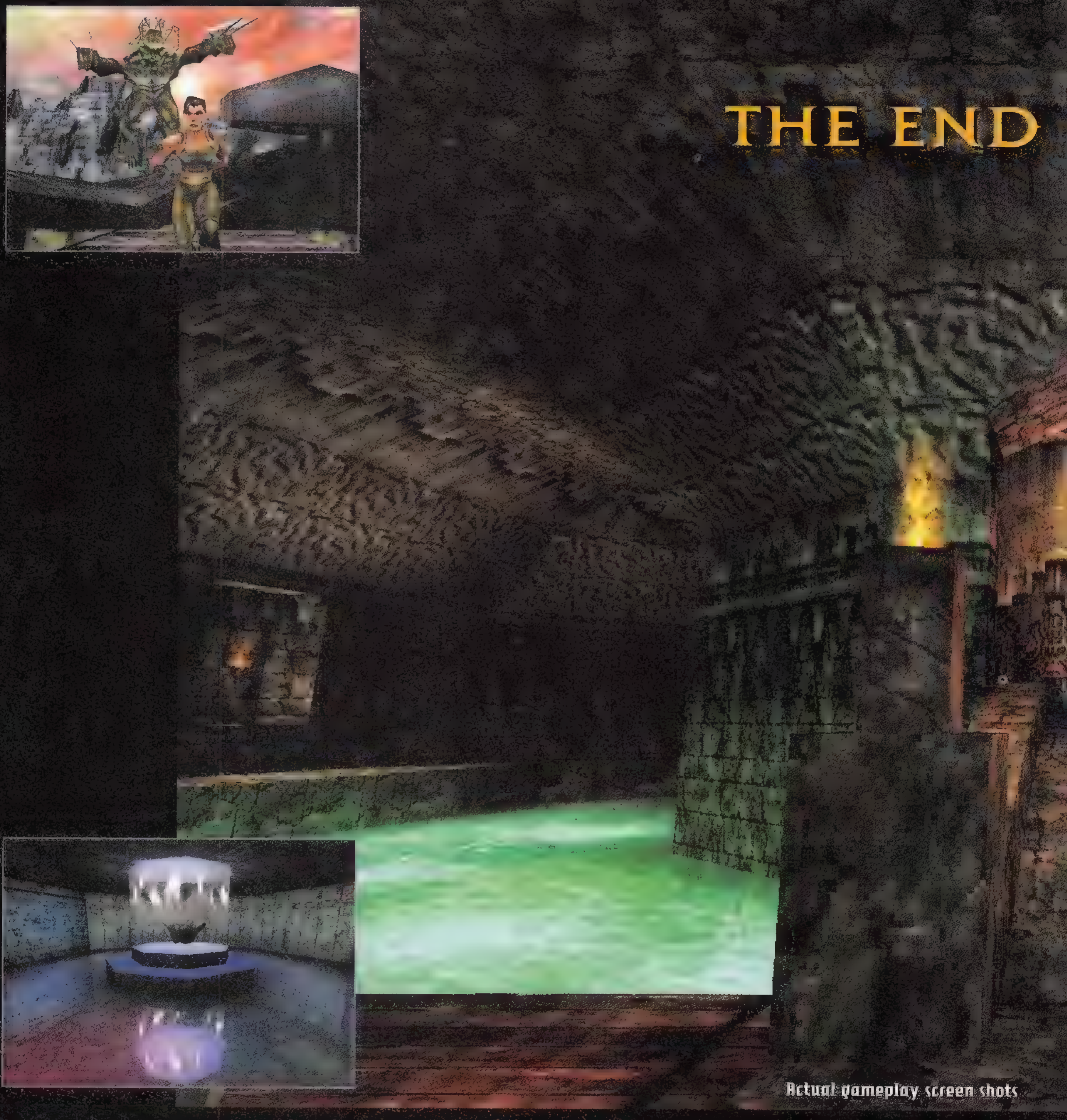

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Sony. Four little letters, one huge company.

Regardless of size, Wataru Ogawa, president of Sony's Information Technologies of America, (the division responsible for the company's purple VAIO PCs and peripherals) claims he isn't out to stomp on the competition. At least not right away.

His mission: do it right. Which explains why Sony, once the sleeping giant of the PC industry, is now ready to awake.

boot** **When Sony introduced its first PC, a lot of people were expecting huge innovation and some new ideas. But the first VAIO PC was rather ordinary. How do you respond to that?

Ogawa That was perfectly in line with our original plan and intention. While our strategy is to sell the PC, at the same time, we sell more peripherals and other things. So when I sell 100 VAIO PCs, for example, I can expect $1,000 in revenues from other products. So we decided not to take too much risk, not because we didn't want to make a truly innovative PC, but because we knew there was a learning process in the PC industry. That's changed our speed of doing business. For example, the life cycle of a Sony Trinitron television is three years. But for a PC, it's only three months! Three months! So almost 1/10th of the speed you have to understand and put in place to compete and survive in this business. And that is a very new experience for Sony. For other Sony products, we have a product line-up meeting every six months or so, for both the U.S. and Japanese markets. And then many engineers and product planners meet with each other every six months to discuss the road map of the products.

But what our group is doing, however, is having the line-up meeting in the bathroom.

boot** **I'm sorry... did you say in the bathroom?

Ogawa [laughs] Yes, does that surprise you? We can't wait six months for product meetings... the speed of the technology and innovations occur daily. So when I happen to see one of my engineers in the bathroom, we talk and see if we understand each other. Side-by-side. We really do make decisions in there.

boot** **OK, so you're doing this on almost a daily basis?

Ogawa Oh yes. And that's also a very new experience for Sony. One of my missions is to speed ahead the regeneration of Sony, not only by making this business successful in terms of volume, but also to bring all of Sony into the new culture, new breed based on the PC industry speed and way of thinking. So I have several missions, not only to sell PCs, but also to continue with the regeneration of Sony based on the PC culture, based on the PC speed, based on the way of managing the inventories. For the PC industry, managing inventory is really almost everything. If I have a three-month inventory of PCs and the life cycle is only three months, what would that mean?

boot** **You're screwed.

Ogawa Very much so!

boot** **But whenever Intel announces a new processor, every other company except Sony announces new products based on the new technology. Sony always seems to wait two or three months to announce those products. Why is that?

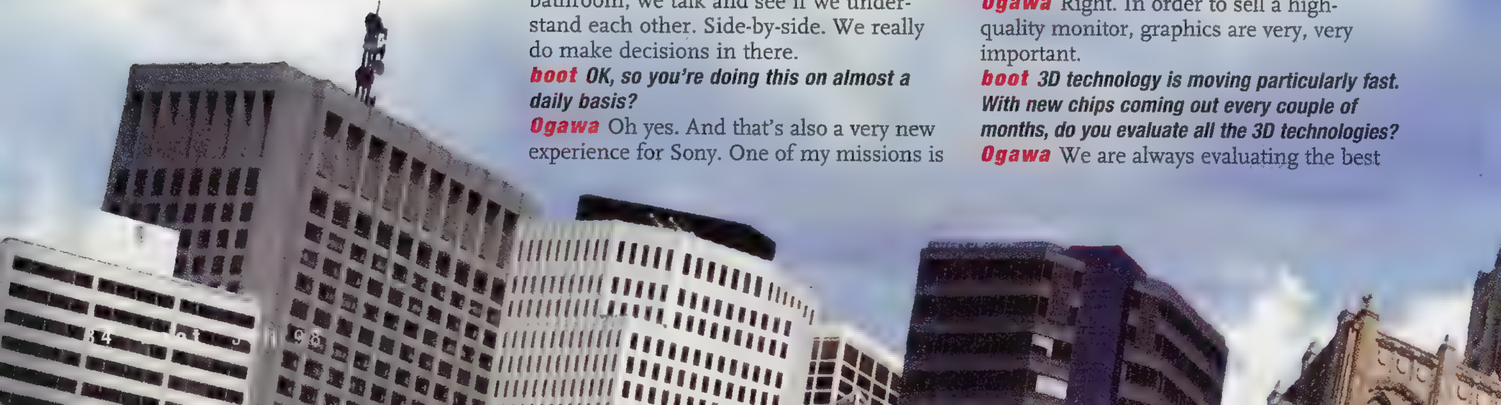
Ogawa Again, this is based on the PC business strategy, which is very unique. We cannot sacrifice the graphic or DVD capabilities for example. The 3D graphic capability is the key on which we base our own decisions. So from that point of view, we may determine which CPU is the best, even though we have to wait one more month or two months for new CPUs. Clock speed itself is not enough to warrant a new product.

boot** **So Sony is not really CPU-centric? If Intel introduces a 500MHz chip, you may or may not come out with a new PC based on it right away?

Ogawa Right. In order to sell a high-quality monitor, graphics are very, very important.

boot** **3D technology is moving particularly fast. With new chips coming out every couple of months, do you evaluate all the 3D technologies?

Ogawa We are always evaluating the best



ng Giant

“**Moore's Law** needs to be thrown >

PHOTOGRAPH BY [illegible]

match for our personal computers. So far, we have selected ATI accelerators because they deliver a complete 2D/3D AGP graphics solution in our desktop systems.

boot ***Being new in the PC business, do you see mistakes that the industry in general makes?***

Ogawa Companies should really question what the consumer really needs. It's not a matter of just speed obviously—there are many other factors at play. I'm not sure if anyone else answers that.

boot ***So Moore's Law that the processor speed doubles every 18 months isn't even relevant to consumers?***

Ogawa No. Moore's Law needs to be thrown out the window. From the consumer point of view, technology and applications should go hand-in-hand. If only the technology is available, such as clock speeds or 56Kbps modems, and there are no applications or content that let consumers fully enjoy that technology, it can be confusing and frustrating for the consumer.

*< out the window. Clock speed itself is **not enough** to warrant a new product."*

Sometimes we ask ourselves: Is this technology really giving the best experience to the consumer?

boot ***But as president, how do you stay in touch with consumers?***

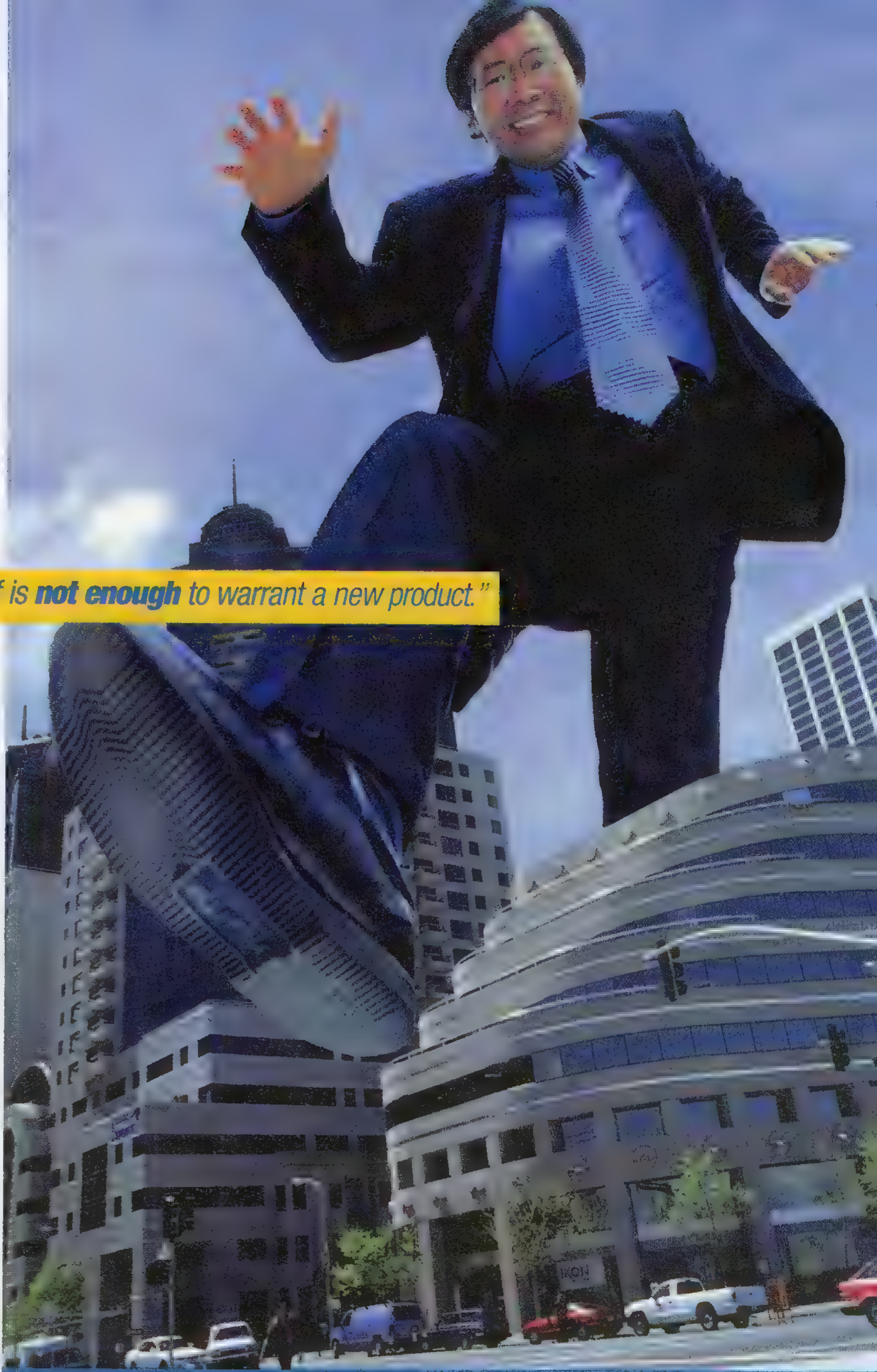
Ogawa I take every opportunity to communicate directly with consumers and sales people. On weekends I like to stop by retail stores that carry our PCs and monitors. I get to see what the competition is doing and hear what customers want in a PC. I also talk with the sales associates and get their feedback on how we can improve our products and help them increase sales. Technology alone is no good unless it has real value to the consumer.

boot ***Has Sony ever encountered any anti-Japanese sentiment from either the U.S. market, your competitors, or any of the U.S. companies you've had to deal with?***

Ogawa I have never experienced that kind of anti-Japanese feeling. But then again, many people have no idea that Sony is a Japanese company.

boot ***A few years ago the PC industry forewarned of a Japanese invasion into the predominantly American market. The first wave of attacks recently receded, with Japanese companies such as Toshiba abandoning the U.S. market. Is there a second wave coming, and is Sony leading the charge?***

Ogawa Other companies may acquire, say, a server company. Sony's philosophy is quite different. Our focus is based on increasing the size of the PC pie and,



The Color Purple

boot ***Teiyu Goto designed the VAIO. Were there color schemes that he came up with that you said "No way, we can't go with this"?***

Ogawa Mr. Goto is very, very stubborn. [laughs] And to convince him otherwise is really tough. We had lots of arguments.

But I appreciate that because in the center of a design, if we didn't have a real professional industrial designer with a very, very strong opinion and belief, we would've come up with a very mediocre design.

boot ***Were there other color schemes considered?***

Ogawa No. VAIO is purple. Actually there are several shades of "VAIO-ish," but my purchasing department says the color used

Sony on the Move

boot ***Mitsubishi makes cars. Yamaha makes Motorcycles. When is Sony going to come up with its own vehicle?***

Ogawa [laughs] Well, everything is possible! But I hardly think Sony will make a car! Personally, I don't think there's any synergy for Sony to make a car itself.

Do you recommend Sony go into the car business?

boot ***Why not? We even came up with a couple of names you could use. The first one was Sony PAIO (PAssenger In/Out), and the Sony DriveMan.***

Ogawa [laughs] Not bad! I'll have to think about that!

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more specifically, PC-related products.

boot ***So what is Sony's core philosophy?***

Ogawa We have five principles, which we apply for the VAIO PC's product design, planning, and development.

Number one: The Sony VAIO PC has to be interoperable with other digital audio/video equipment, such as a MiniDisc, a 200-disc CD changer, or one of our digital camcorders or digital IC recorders.

Number two: Everything we develop under the VAIO PC brand should be easy to use. Pure and simple.

Number three: The product must be fun. The PC should not only give you improved efficiency in the office—it should also provide a new dimension of enjoyment using the latest computing power and the software applications. For example, connecting a 200-disc changer and a MiniDisc recorder to a VAIO PC allows you to easily make your own custom MiniDiscs, which can be edited on screen using software we developed.

boot ***Wouldn't that violate copyright laws?***

Ogawa As long as you're using them for your own private, personal usage I think that would be OK. Nobody will sue you. But once you go out of that boundary and start selling your custom MiniDiscs, well that's a different story altogether.

boot ***You're not telling people to do that?***

Ogawa [laughs] No, no! We are also the world's biggest music company. If we allow people to do that, we kill ourselves. But this was just one example of how to make the computer more fun. You could also hook a digital camcorder into your PC and edit movies.

boot ***Back to your list...***

Ogawa Number four: The industrial design should be sleek and cool, making the product almost irresistible to buy! We really target feel-it and touch-it designs. Our purple body color is very different from conventional PC or notebook products. It should be very distinctive, so people will recognize it as a Sony product.

Our final philosophy is that our products must provide superior value.

boot ***Are all of those points ranked equally?***

Ogawa It depends on the products. For example, our new sub-notebook has particularly emphasized three points out of the five. It has a very sleek industrial design and a time function in it. Can you imagine why you would need a time function in a computer?

boot ***No. Please do tell us.***

Ogawa [all excited] See! I don't think any personal computer has been equipped with a timer to date, but this one has.

The whole concept relates to time shifting. Think of the VCR. You set your VCR to record your favorite programs, so you won't miss a single thing. The timer on our new sub-notebook is based on that concept.

In the morning, many people want to see the e-mail sent to them while they were sleeping. So you set the timer to power on and start application software... in this case, e-mail, and by the time you finish coffee and toast, you are ready to go. Your machine has all the latest e-mail messages that you can then check and reply to while on the train, before you even get to the office.

Before I leave my home for example, I've already spent almost one hour checking e-mail I received the previous evening. Without a timer, I'd have to wait for the machine to boot up and then manually activate the application myself.

boot ***Do you specifically develop products for say the Japanese market that you know will never appear in the U.S. markets?***

Ogawa Basically yes. For example, we first introduced our sub-notebook into the Japanese market. And that was a deliberate intention.

boot ***Why?***

Ogawa Japan is a very small country, there's a space factor. It's a big deal. In the U.S. however, consumers are still using full-sized notebooks. We try new concepts on the Japanese market and see if we can create a big splash and a big success in Japan with this machine first. And if we're successful—and we were, by the way—the Japanese market will tell the rest of the world how wonderful and nice the product is! And that's exactly what's happening now.

Even though we may not be introducing a product in the U.S., many U.S. consumers and publications are already asking questions. It's amazing!

So my bottom line is yes, we are very sensitive to the difference in the taste and the youth model in the lifestyle. So we make judgments.

boot ***What about the feeling that the U.S. market appears to be second on your list? Japan always seems to have the cooler toys first.***

Ogawa No, that is not true. Twelve months after the U.S. introduction, we started marketing the VAIO mini-tower in Japan.

boot ***What are the differences between the U.S. and Japan that make the Japanese people early adopters?***

Ogawa I don't know why, but Japanese consumers like products that provide a lot of fun, based on the latest technologies as a part of a hobby or as part of enjoyment. I think that U.S. people, particularly in IT business areas, are very much sensitive to what they have to pay, and the price/value relationship.

boot ***Can a product be a success without even penetrating the U.S. market?***

Ogawa Without success in the U.S., there is no true success. The question is time lag. Once it's accepted in the United States, we can go really quickly through the rest of the world—China or Latin America or the Middle East, etc. Sometimes we test-market some new product in Japan and then modify it before we really hit volume in the U.S. market. Once we make a huge success in the U.S. market, then our job is much easier. We really focus on both the Japanese markets and the U.S. markets... but for different reasons.

boot ***Sony has so many different divisions. What kind of impact do those other divisions have on the PC side of things?***

Ogawa In any organization, there is always a war between the divisions. And that's unavoidable.

boot ***How big is the internal squall?***

Ogawa Sometimes very high; sometimes very deep. But there, Sony is again very unique in overcoming this type of strife, which can exist between the older disciplines or business units. We have up to ten business units in Japan, ten companies, each of which have independent P&L responsibilities within the company. That's the major structure.

boot ***OK, but how does this make Sony unique?***

*"We may introduce products **later than our competition**, but at least the consumer knows* >

most often is 60 Cyan and 50 Magenta. And we're very proud of having made the decision to use this color. People would say, "This is too different from conventional PCs." And we would say "We have no intention of going into the conventional PC [illegible]

[illegible]

Ogawa The key players from each of ten business units are selected for a virtual business center. And they are given a virtual P&L and only two years to focus on developing new products. Their single objective is to optimize the total Sony interest, as opposed to personal agendas. And once the product is successful, the unit is dissolved.

boot ***What happens if you don't meet your goals in those two years?***

Ogawa Well, somebody may lose a job! The difference is that the commitment and contribution is to the entire Sony Corporation, and not just one division.

The Sony Pilot Killer

boot ***Sony is the perfect company to make a Pilot killer. So where is it?***

Ogawa Personal terminals would be a huge market, but it has to be distinctively Sony. The Palm Pilot is a huge success. Personally, I wish I could have introduced that product two years ago as a Sony product.

we've done so in order to **integrate Sony quality**."

boot ***How important is the sub-$1,000 PC market and how will Sony compete there?***

Ogawa Very important. Look at penetration of PCs in the home, it's still at 35% to 38%. And this is stagnant right now. The PC industry is very eager for the next trigger to go to 60% or 80% penetration, like telephones or TVs, which are almost at 110%. So to make the big leap, we need a very, very different concept.

I think the sub-$1,000 PC will play a significant role. And, of course, we are very much interested again, not because of the market share or volume, but because we like to sell other Sony digital A/V products, by utilizing the PC as a platform.

boot ***Does Sony have to make any compromises for the sub-$1,000 PC market?***

Ogawa Well, of course it should cost under $1,000.

boot ***Do you have to lose any of your innovation to do that?***

Ogawa No, no, no. Whatever we introduce, regardless of the price point, we believe that confidence in the Sony name is the biggest asset we have. So we can never, never sacrifice that trust by going and presenting cheap products.

That's a real concern. If I fail by offering lousy products for the computer, then tomorrow these will handicap our CD business. Even the Sony Picture and Sony Music divisions could be impacted. Honestly, this is an immense pressure for me.

We will never enter a market, regardless of the price, until we can ensure it upholds Sony's commitment to quality. We may introduce products later than our competition, but at least the consumer knows we've done so in order to integrate Sony features and the Sony quality.

With the VAIO products, you can immediately discern the difference from other products in the market. That's what Sony is all about.

boot ***How much would it take for Sony to convert the PlayStation into a traditional sub-$1,000 PC?***

Ogawa We are looking very carefully at that. It would be nice to enjoy the exciting PlayStation software on a VAIO PC. But when it comes to sub-$1,000 PCs, what's the overall solution? Gaming? Yes. The Internet? Yes. Spreadsheets and word processing? Less so. Many potential end users looking at the sub-$1,000 PCs are very much interested in the high capability of the graphics-based video games.

boot ***This is something Sony is looking at doing?***

Ogawa We're always looking. We have idea people who do nothing but look! Besides, the PlayStation, for the most part, is already a computer. But it could have a lot of additional features, such as receiving data from the Internet or signals from a satellite. So the PlayStation can also be a very popular little box that can replace a lot of what PCs offer today.

"The **PlayStation**, for the most part, is **already a computer**, but it

boot ***Is consumer satisfaction in the Sony name just as important to you as their satisfaction in using the product?***

Ogawa I still clearly remember what Mr. Ohga [Sony Chairman and CEO] said when he called me. "You can use the money to sell computers. You can even lose a lot of money. But you can never, never lose the confidence of our end users: S-O-N-Y, those four letters, if you lose that, you're out of employment." That dearly describes how we view or value the Sony quality image, trust, and confidence we are getting from our end users.

And that's helped make my step up from the PC business a little bit easier. I was able to capitalize on the Sony way—confidence that has been built based on the camcorder or Sony Pictures, Sony Music, Sony PlayStation, CDs, and so forth.

For me, I had an advantage that can never be enjoyed by other companies who started their PC business. I've got some good help.

boot ***When we originally spoke to Sony way back in 1996, the company claimed it was shooting for the number-five spot, yet the company is currently ranked near the bottom. What went wrong?***

Ogawa Actually, for a start-up company in the PC business we are doing pretty well. We have met or exceeded our sales and production goals for our first two years and are very optimistic as we enter our third year. Additionally, I'd like to mention that our PCG-505 series and our full-size notebooks are very successful in Japan. Sony is now ranked number three there in retail notebook sales. Here in the U.S., we are poised to roll our most innovative PC products so far and believe consumers will like what they see.

boot ***Does Sony have any plans to enter the corporate market?***

Ogawa I'm very much interested, but again I must say there should be a Sony way to get into this segment of the market. There always has to be a Sony way.

boot ***And if you can't do it the Sony way, then it's the highway?***

Ogawa Correct. There's no sense for us to get involved in the price war. We have no interest in that.

boot ***But why does it always to be "Sony's way or the highway?" In addition to DVD+RW, Sony has been responsible for a number of competing standards, such as Betamax and SDDS. Why doesn't Sony ever adopt other people's standards?***

Ogawa "Research makes the difference" is a longtime motto at Sony. Certainly, being different from others has been and still is a big part of our corporate culture. We're a leader in the electronics industry and devote immense resources to research and development. This often leads to new formats that evolve into standards. We developed the original technology that led to today's CD-ROM and 3.5-inch floppy disk standards that are universal to the PC industry. But the idea that it's our way or the highway is not accurate. For instance, once the VCR format war was over, we began manufacturing machines using the VHS standard.

***boot* Your new HiFD storage technology appears to be a carbon copy of the LS-120 SuperDisk but with a greater storage capacity. Why bother?**

Ogawa There are two strategies. One is to just follow. That's not what Sony is about. Our strategy is try to find something better, even though we have to spend lots of R&D investment. And as long as we think there is potential for expansion, be it from a software or hardware perspective, then our belief is why not?

***boot* What kind of expansion?**

Ogawa Capacity.

***boot* So you want to go beyond 200MB?**

Ogawa Very possibly. Also, we make sure these new storage devices are compatible. That's a responsibility of the technology innovator. Sony invented the 3.5-inch floppy disk and made it worldwide standard. And when we introduce new storage devices, they must be compatible with current consumer products.

***boot* Why did Sony break off from the DVD-RAM camp? What does the 3.0GB format really provide over the 2.6GB standard?**

Ogawa The capacity is really a secondary issue. We decided to develop DVD+RW as a read-writable format that would deliver increased compatibility. Disks written on a DVD+RW drive are readable on second-generation DVD-ROM drives (2x or faster). DVD-RAM disks are not cross compatible.

***boot* We've heard you're introducing a feature into your new displays. What is it?**

Ogawa Sony's new IntelliLight technology is incorporated into the current line of VAIO displays and greatly enhances the picture performance of an executed application. This feature is implemented using special VAIO software and enhanced GPE technology developed by Sony called Intelligent Graphics Picture Enhancement (IGPE).

Typically, display performance is optimized for the presentation of text and static images. However, this optimization is not ideal when displaying graphics or video. IGPE provides optimal picture enhancement for the desired application. By pressing a single button, Standard, Presentation, and Graphics/Video modes can be selected. These modes enhance the entire picture by automatically adjusting the brightness, sharpness, and color temperature of the image.

However, in many cases the user wants to enhance the picture quality of the images created by an application and not the entire displayed screen, for example, when viewing DVD video and concurrently working on a spreadsheet. IntelliLight makes this possible through IGPE and IntelliFrame software, which creates a user-defined display window on the desktop. Only applications running within the IntelliFrame window will be displayed utilizing IGPE.

***boot* Is there any performance hit on the PC when you're doing that?**

Ogawa It's negligible. The GUI is focused over the area of the screen where the video is and enhances only that portion. I don't even know if it's measurable. I'm sure it's less than 1%.

Many people wondered how exactly Sony differentiates itself from a Compaq or Packard-Bell. When we decided to enter into the PC business, we were very frustrated by the quality of video on the PC. We were A/V specialists before entering the PC business and one of our goals was to find a way to improve the movie signal on the computer screen. This is one of the solutions we came up with.

The upshot is that this fall you will see a very big difference between the multimedia on our PCs compared to others in the industry.

Seeing is believing.

***boot* We'll be looking. If you couldn't work at Sony, where would you work?**

Ogawa I'd have to retire! [laughs] b

Download While You Sleep

***boot* MiniDisc has had a hard time with stand-alone acceptance. Will integration with the VAIO make it more viable?**

Ogawa Think about electronic music distribution. What may not happen to video can easily happen with the music because the bandwidth can be much, much narrower to send and receive music digitally. This is very much a reality now.

During the night while you're sleeping, you can download all this music from the satellite onto a MiniDisc. When you wake up the next morning, you have your own custom MiniDisc. Can you imagine that?

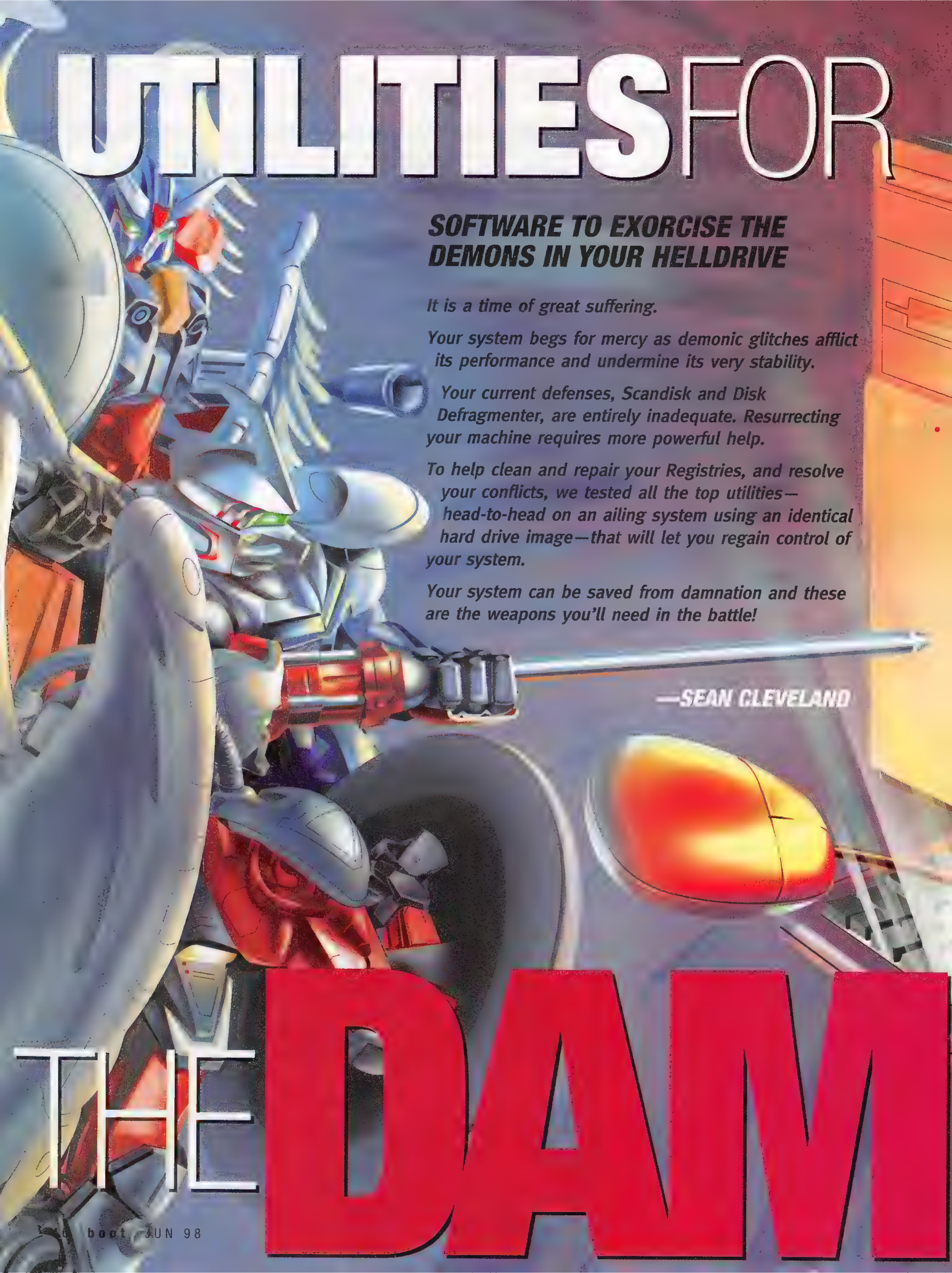
***boot* Sure.**

Ogawa That's why we're entering the PC business.

***boot* The natural question then is "Why haven't we seen a VAIO PC with a MiniDisc built in?"**

Ogawa We already have PCs in Japan that can be connected to a MiniDisk through an A-1 controller. So as far as components go, they already do connect. But there's no reason not to include a minidisk in a computer. You may see them integrated in the future. Think about the minidisk as a storage medium. Since they can hold 640MB of data, it could conceivably replace the floppy disk I suppose. But with every new technology or idea, you've got to overcome the timing and cost factors. It's safe to say we are working on various new storage devices and looking at using the MiniDisc as a possibility.

*could also receive data from the Internet. So the PlayStation can **replace** a lot of what **PCs** offer today."*



UTILITIES FOR THE DAM

SOFTWARE TO EXORCISE THE DEMONS IN YOUR HELLDRIVE

It is a time of great suffering.

Your system begs for mercy as demonic glitches afflict its performance and undermine its very stability.

Your current defenses, Scandisk and Disk Defragmenter, are entirely inadequate. Resurrecting your machine requires more powerful help.

To help clean and repair your Registries, and resolve your conflicts, we tested all the top utilities—head-to-head on an ailing system using an identical hard drive image—that will let you regain control of your system.

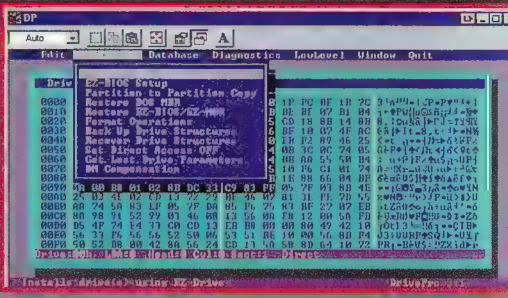
Your system can be saved from damnation and these are the weapons you'll need in the battle!

—SEAN CLEVELAND

NED

ILLUSTRATION BY RON MCPHERSON

DrivePro 3.0


DP
Auto
Edit
Database
Diagnostics
LowLevel
Window
Quit
EZ-BIOS Setup
Partition to Partition Copy
Restore DOS MBR
Restore EZ-BIOS/EZ-MBR
Format Operations
Back Up Drive Structures
Recover Drive Structures
Set Direct Access OFF
Get Lost Drive Parameters
DM Compensation
Installs drive(s) using EZ-Drive
DrivePro 3.0

A slew of utilities makes installing new hard drives simplicity, even on old decrepit hardware.

Hard drive installations don't necessarily come easy. Some old motherboards don't support drives larger than 528MB, and old BIOSes don't have that autodetect feature we've come to love. Enter *DrivePro 3.0*, a utility that provides all the tools you need to install, diagnose, and recover hard drives and hard drive controllers.

Its main function is to help expedite the installation of IDE drives. It comes with a database that lists every known drive (sorted by manufacturer), giving you all the data you need for installation. If you find that your BIOS doesn't support drives larger than 528MB, you can use the utility's EZ-BIOS. This code replaces the conventional Master Boot Record and resides on the hard drive rather than within the volatile CMOS (this means it won't be lost if the battery fails). And since EZ-BIOS resides on the hard drive, it can be moved from system to system regardless of BIOS configuration.

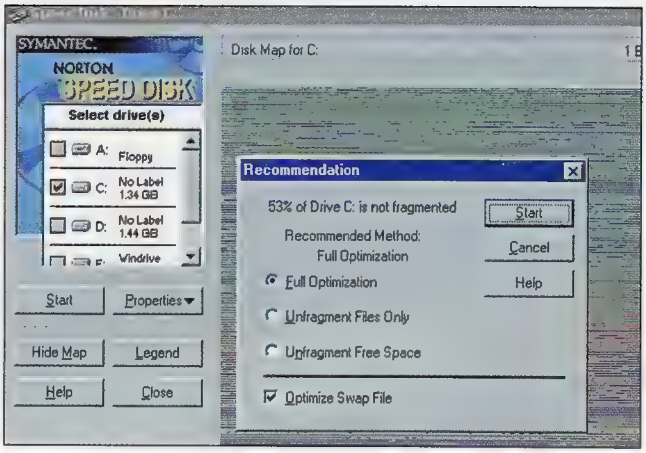
DrivePro 3.0 includes utilities for unconditional, quick, and low-level formatting. Diagnostic tools include linear, butterfly, and random tests, along with benchmarks for average seek time and average throughput. You can also back up drive structures and vital system data to a hidden partition for easy recovery. EZ-S.M.A.R.T., Self-Monitoring Analysis and Reporting Technology, gives monitoring access for drives that support it, and EZ-COPY makes cloning drives a snap.

The user's manual may be the best part of the package. Sure, it outlines the software but also includes a complete history of hard drives and how they work. The sheer amount of knowledge in this tome will have you rising above the ranks of the damned in no time.

boot verdict 9

Price *$70*
Company *MicroHouse*
Phone *800.926.8299*
URL *www.microhouse.com*

Norton Utilities 3.0



☐ A: Floppy
☑ C: No Label 1.34 GB
☐ D: No Label 1.44 GB

53% of Drive C: is not fragmented

Recommended Method:
Full Optimization

● Full Optimization
○ Unfragment Files Only
○ Unfragment Free Space

☑ Optimize Swap File

The hard drive is cleaned and defragmented after the Registries and Swap File are rebuilt, compressed and optimized.

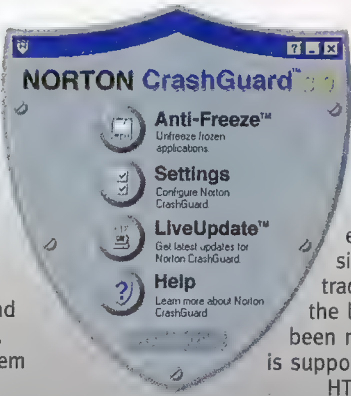
The venerable *Norton Utilities* lead wayward machines away from the abyss of data corruption and back into the light of system serenity. Time and time again, bootEditors have turned to *Norton* for help with corrupted drives—and the software has delivered without flinching. But this utility suite offers far more than just the single service of data recovery, so let's take an inventory of the master's magic bag.

We begin with Disk Doctor. In addition to data resurrection, it checks your partition table, boot record, and file and directory structures. It also performs a surface test to check your hard drive for read errors—just like Windows ScanDisk. But Disk Doctor goes beyond ScanDisk with features such as selective surface checks (for just the areas that contain data) and customizable options for fixing file allocation tables, partition tables, directory structures, compression structures, and boot records.

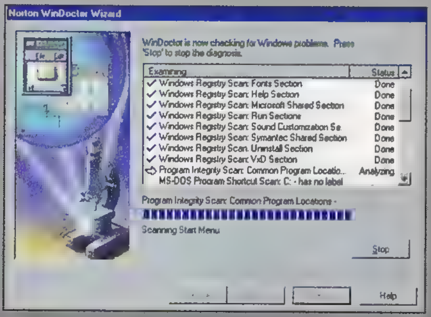
On our test machine, Disk Doctor found that the boot area contained invalid information about the drive's free space—and exorcised the problem.

WinDoctor diagnoses and repairs Windows problems, checking the Registry, system folders, and application folders for invalid Registry entries, lost shortcuts, and missing files, such as DLLs. The software also optimizes your Registry, the database that houses all Windows 95 hardware and system information, by cleaning up unused links and leftover space caused by the removal of files.

Space Wizard identifies files that are discardable, infrequently used, or excessively large, or have duplicates elsewhere on the computer. It then compresses, deletes, or moves files elsewhere, saving you valuable disc space. An initial "express" search of our test system found plenty of temporary and cached files, and cleaned up 8.7MB of space. A subsequent "comprehensive" search found no additional files.


NORTON CrashGuard™
Anti-Freeze™
Unfreeze frozen applications
Settings
Configure Norton CrashGuard
LiveUpdate™
Get latest updates for Norton CrashGuard
Help
Learn more about Norton CrashGuard

This 16- and 32-bit crash defender may well be your last line of defense against evil and chaos.



WinDoctor is now checking for Windows problems. Press 'Stop' to stop the diagnosis.

Examining	Status
✓ Windows Registry Scan: Fonts Section	Done
✓ Windows Registry Scan: Help Section	Done
✓ Windows Registry Scan: Microsoft Shared Section	Done
✓ Windows Registry Scan: Run Sections	Done
✓ Windows Registry Scan: Sound Customization Se	Done
✓ Windows Registry Scan: Symantec Shared Section	Done
✓ Windows Registry Scan: Uninstall Section	Done
✓ Windows Registry Scan: VxD Section	Done
⇦ Program Integrity Scan: Common Program Locatio...	Analyzing
MS-DOS Program Shortcut Scan: C: - has no label	

Program Integrity Scan: Common Program Locations -

Scanning Start Menu

WinDoctor searches for all manner of vile creatures in your Registry and cleans skeletons from the hard drive.

The Optimization Wizard fine-tunes some of your system software's most arcane inner machinery. It begins by benchmarking your hard drive to determine the fastest location for the Swap File, then moves the Swap File there. It also shrinks or enlarges the Swap File to accommodate your memory needs.

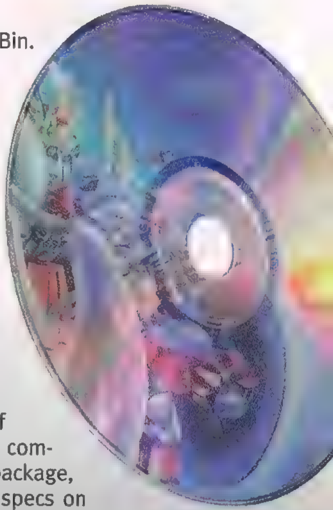
SpeedStart accelerates application launch times. Its settings are automatically configured—manual tweaking would have been nice—and works invisibly in the background. We experienced about a 50% improvement in loading times, which is consistent with performance claims.

The remainder of *Norton*'s spells are for adept masters intent on exorcising the most elusive demon-spawn. File Compare lays two different versions of a text file side-by-side. You can then track changes by highlighting the lines that differ or have been moved. Any text-based file is supported, including INI and HTML files. File Compare can also be used in conjunction with the Registry Tracker, which helps you record changes made to critical files, folders, and Registry keys. It takes "snapshots" of tracked items, displaying any changes made and giving you the ability to restore items to their previous state. The software also tracks changes to any INI and data files stored in binary form.

The advanced Registry Editor not only allows you to navigate, edit, and back up the Windows Registry, but also contains a bookmark section, advanced search abilities, Undo, and a history window. UnErase reanimates files you foolishly vanquished from the Recycling Bin. When we ran the wizard to see what could be recovered, it found 25 files. But after recovering the files and reentering the wizard, the software found an additional 335 files! This was the only inconsistency we uncovered during testing.

A new version of System Information completes the *Norton* package, with more detailed specs on peripherals, multimedia devices, and Internet/ network connections. And of course you also get benchmarking utilities, including the CPU benchmark that begat the bootMark way back in the dawn of time.

It's imperative that you get the latest update patch—3.02, available on this month's bootDisc or from Symantec's web site—as the shipping version is plagued with large bugs. It loses Registry settings, truncates Registry entries (causing data corruption), destroys Zip disc formatting (when using the Zip Rescue feature), and locks up when using the Speedstart feature on systems running McAfee *VirusScan*. Bugs aside, *Norton Utilities* does fix problems and improve performance as promised. If you've witnessed the hounds of hell gnawing slowly at your machine, reciprocate in kind with this brimstone-breaker.

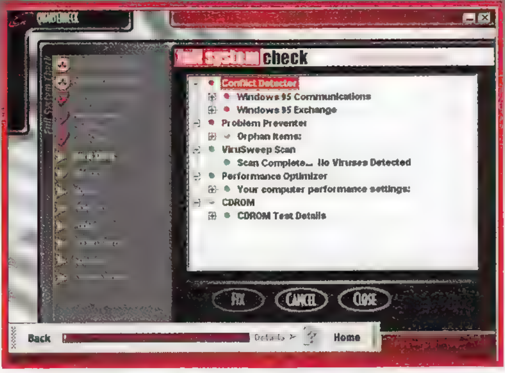


Price $79 ($30 rebate with upgrade)
Company Symantec
Phone 800.441.7234
URL www.symantec.com

boot verdict 9

THE DAMNED

Extra Strength RealHelp



- Conflict Detected
  - Windows 95 Communications
  - Windows 95 Exchange
- Problem Preventer
  - Orphan Items:
- ViruSweep Scan
  - Scan Complete... No Viruses Detected
- Performance Optimizer
  - Your computer performance settings:
- CDROM
  - CDROM Test Details

All components are checked via the Full System Check, which offers a phat database of tips and fixes for most problems.

RealHelp promises to deliver you from the madness of Windows conflicts and hardware incompatibilities—but this software isn't for the weak. A slow interface laden with confusing buttons makes *RealHelp* a chore to weed through, especially with so many menu options tucked away from the utility you're currently working in.

The product suite focuses on Prevention, Repair, Diagnostics, Inventory, and Support. Hitting the big "Check" button on the startup screen ignites the fully configurable Full System Check, which puts your system through the diagnostic gauntlet (this is the least confusing way to start). This process frequently sends pointers to built-in Windows utilities, so you won't get an entirely new suite of tools.

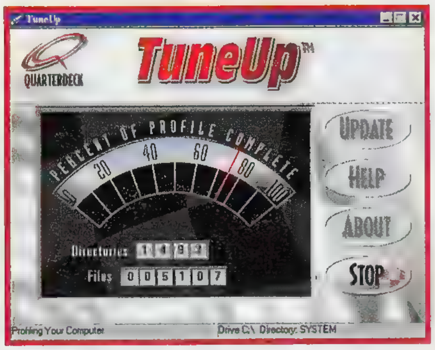
The Update button is your jumping-off point to TuneUp, which profiles your system and locates updates and patches online for all installed software. Once you decide to install an update, the Change Capture Agent pops up, allowing you to record changes to your system for easy resurrection. The software found more than 80 updates—everything from an *Office 97* patch to a new network card driver—when we diagnosed our sick test machine.

The Conflict Detector analyzes your system for problems among apps, the OS, and hardware. It also checks for missing files caused by incomplete installations. Our test run found conflicts with 11 applications. When the software couldn't fix a conflict, it offered repair suggestions with detailed bug reports. The software also discovered that eight other apps were missing files (chasing them down brought up dialog boxes asking for the original install disks).

The Problem Preventer lets you fix unresolved shortcuts, re-establish Registry integrity, and check crucial system files such as AUTOEXEC.BAT and CONFIG.SYS. Our test machine had an unresolved reference with the DOSKEY.EXE file in AUTOEXEC.BAT. Although it found the problem, we had to fix it manually.

The confusion really begins with the Service Manager. Is this where you schedule all your utilities, or simply a place where more utilities are hidden? It's both (and we have to wonder why you can't set scheduling within each utility itself). Within the Service Manager, you'll find Crash Defender Agent, Backup Agent, Conflict Detector Agent, Disk Fix Agent, Emergency Recovery Agent, and Memory Agent. A bunch of other agents are also available, all of which would make more sense as options under the main buttons. The only other noteworthy agent is S.M.A.R.T. Agent, which takes advantage of Self-Monitoring Analysis and Reporting Technology to detect problems with your hard drive before it fails (of course, the hard drive must support S.M.A.R.T. as well). And there's a Disk Optimizer Agent that merely launches the Windows Defragger. This agent is only slightly less offensive than the Hardware button that brings up the Device Manager.

The interface is dog slow. It's almost faster to close and relaunch the entire application than move between interface windows. And you shouldn't have to bother with this hassle in a shell that sometimes does little more than point to Windows system utilities. The only powerful feature is the TuneUp software—which can be bought separately for a cheaper price.



Directories 1 4 8 3
Files 0 0 5 1 0 7

Profiling Your Computer
Drive C:\ Directory: SYSTEM

Arguably the best part of Real Help, *TuneUp locates apps on your drives and updates from Quarterdeck's web site.*

Price $60
Company Quarterdeck
Phone 800.683.6696
URL www.quarterdeck.com

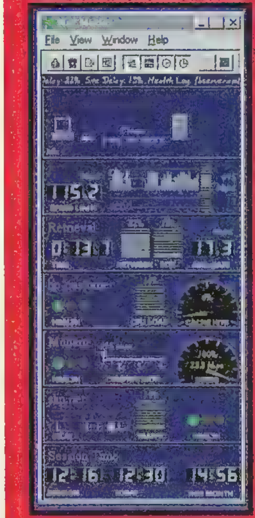
boot verdict 5

NetMedic

Windows 95 can report your modem connection speed and the number of bits you send and receive, but it won't tell you jack about your average throughput rates or where your online bottlenecks are hiding. Enter Net Medic for a little illuminating triage.

The utility offers three distinct services: performance reporting, problem diagnosis, and problem fixing. The performance reports are the perfect antidote for web surfers fraught with the neurotic suspicion that their Internet connection is cheating them. You get realtime stats on everything from the actual Kbps you're clocking to the number of router hops between your computer and the remote server.

Different interface panels provide performance reports on each link in the IP throughput chain. Your PC is assessed for CPU load and cache hits while your ISP, the Internet backbone, and remote net server are assessed for delays and capacity stress. While it's fascinating to have a speedometer on throughput rates, we weren't convinced that the software was accurately reporting network capacity. Net Medic reported our ISP was consistently bogged down by a 99% local capacity load. A call to the ISP's tech support, however, put us in touch with a troubleshooter who uses Net Medic himself—and loves it—but finds it misreports ISP network loads as worse than they actually are.



Throughput specs take the guesswork out of IP action.

The utility's diagnostic tools make a valid attempt to fix what ails ya, but some Internet diseases are intractable. When Net Medic reports that the backbone is to blame, you're encouraged to dial in during off-hours. And if your ISP or the remote server is to blame, the utility offers to send an e-mail message notifying the appropriate parties of the problem (we're sure network ops worldwide are just loving this snotty feature). On the flipside, Net Medic did find and fix a modem setting error, giving us tangibly better throughput. The utility isn't a panacea, but it does a valiant job telling you all it can about IP voodoo science.

Price $50
Company VitalSigns
Phone 888.984.8529
URL www.vitalsigns.com

boot verdict 7

UTILITIES FOR

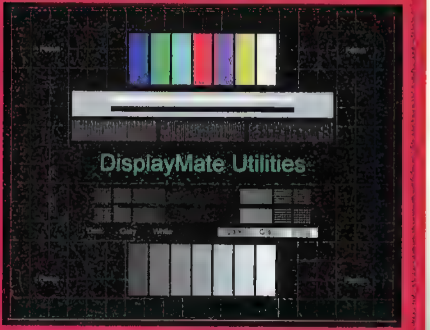
DisplayMate

This utility is the industry standard for diagnosing and fine-tuning CRT monitors. The simple interface is just a shell for a massive collection of test screens, each designed to evoke and amplify your videocard and monitor's most subtle flaws. In fact, for our monitor reviews, we use DisplayMate's Video Obstacle Course, a test script of "the most demanding and difficult images your monitor will ever have to display." These screens reveal defects such as geometric distortion, pixel sharpness, color registration, and moires. Better yet, accompanying online help tells you exactly what to look for, what causes each problem, and how it can be fixed with standard monitor controls (though some problems can be traced to your videocard and cabling).

All of DisplayMate's test scripts draw from the same pool of images. Besides the Video Obstacle Course, you get a simple Set-Up script for optimum grayscale and contrast adjustment, and an extensive Tune-Up program that contains scripts for geometry and distortion, sharpness and resolution, screen pixel resolution, and color and grayscale. Choose any one of these scripts and you'll address the display problems that plague you the most. And if you only have a few seconds, you can run the Master Test Pattern, which throws a whole bunch of visual benchmarks on a single screen.

In September, Sonera Technologies will release DisplayMate for Windows Multimedia Edition. This update includes scripts for TV, LCD, and video projector displays, as well as color printer calibration. But chances are you'll do fine with the regular version, which offers plenty of information for calibrating design workstation monitors. DisplayMate can help boost performance in the most tangible of computer components, so quit the fumbling and guesswork and fine-tune the hidden picture within.

—JP



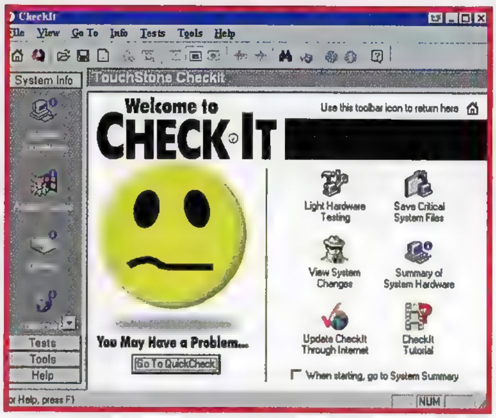
The Master Test Pattern includes numerous visual checks in a single screen.

Price $79
Company Sonera Technologies
Phone 800.932.6323
URL www.displaymate.com

boot verdict 10

CheckIt Professional Edition

CheckIt, a comprehensive suite of diagnostic utilities, dredges up all the info that Windows tends to hide. The interface is broken into four main sections—System Info, Tests, Tools, and Help—but also contains menus for instant access to diagnostic reports, system snapshots, preferences, and help features.



Welcome to
CHECK·IT

Use this toolbar icon to return here

You May Have a Problem...

☐ When starting, go to System Summary

or Help, press F1

Upon startup, CheckIt *analyzes and diagnoses your machine, informing you of anything threatening your machine.*

System Info goes well beyond anything offered by Windows, giving you the most comprehensive data we've ever seen for active tasks, memory sizes and system loads, drive letter allocation, modem settings, motherboard features (including BIOS and CPU info), network adapters, and protocol info. A section devoted to resources breaks down IRQs, DMA, I/O, and memory settings, much like the Windows Device Manager but with info on each port's standard usage, assignments, and current status in much more elaborate detail.

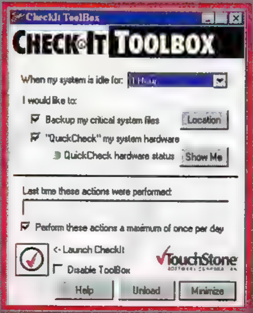
The most powerful features are in the Tests section. The video calibration test offers a miasma of display tests in various resolutions. The hard drive test uses four different read tests, churning through the boot sector, FAT sectors, root directory, and data sectors. Memory testing checks the base memory (0K–640K), extended memory (everything above 1MB), expanded memory (EMS), and video memory. The motherboard test checks the CPU, numerical processor, realtime clock, DMA controller and interrupt controller, and offers troubleshooting advice if problems are found.

CheckIt begins a full appraisal of your machine as soon as you launch the software. A check of our test machine revealed that critical system files—User and System registries, as well as boot drive files—had not been backed up. We were prompted to enter the Tools section and back them up via the Save Critical Files utility. Problem solved.

The Tools section also contains Active Update, an auto-updater for *CheckIt* patches (Service Pack 1 is out and can be updated through the software automatically or pulled from this month's bootDisc); a benchmark utility that delivers separate device scores; System Spy, which allows you to make "snapshot" profiles of your machine's hardware, software, system files, and performance scores; and a utility that restores critical system files.

CheckIt Professional contains extras that don't come with the regular version: *CheckIt for DOS 4*; a full version of *PC-cillin Anti-Virus 3* with an emergency clean disk; a burn-in and certification floppy; a CMOS save and restore app; and a toolkit. The toolkit includes a small Phillips-style screwdriver and special loopback plugs for testing your parallel and serial ports (these are important because if you don't have devices hooked up to the ports, they can't be tested). The full manual for both Windows and DOS is included both on the CD-ROM and in paper form.

The truly hardcore should get the Professional Edition just for the DOS tools, which include a complete suite of hardware tests and burn-in and certification tools with report-generation and journals. With *CheckIt Professional*, you can put your machine through the gauntlet and know it'll survive the long and grueling ascent from hell.



When my system is idle for: 1 Hour

I would like to:

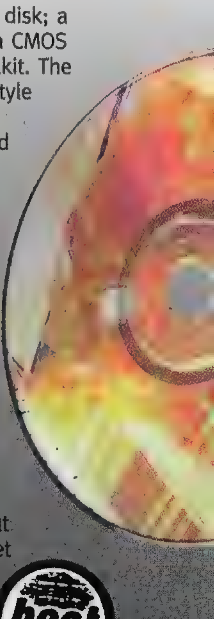
☑ Backup my critical system files
☑ "QuickCheck" my system hardware
QuickCheck hardware status

Last time these actions were performed:

☑ Perform these actions a maximum of once per day

<- Launch CheckIt
☐ Disable ToolBox

For those constantly swapping out hardware, ToolBox checks your system automatically so you don't have to.

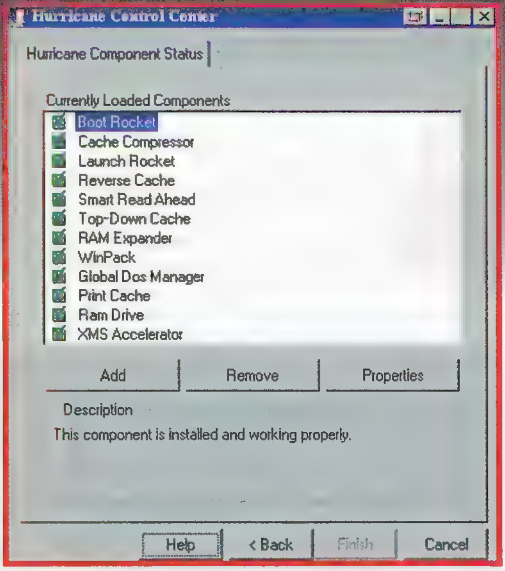


Price $43
Company Touchstone
Phone 800.531.0450
URL www.touchstone-software.com

boot verdict 8

Hurricane 98

boot KICK ASS! PRODUCT


Hurricane Control Center

Hurricane Component Status

Currently Loaded Components
- Boot Rocket
- Cache Compressor
- Launch Rocket
- Reverse Cache
- Smart Read Ahead
- Top-Down Cache
- RAM Expander
- WinPack
- Global Dos Manager
- Print Cache
- Ram Drive
- XMS Accelerator

Description

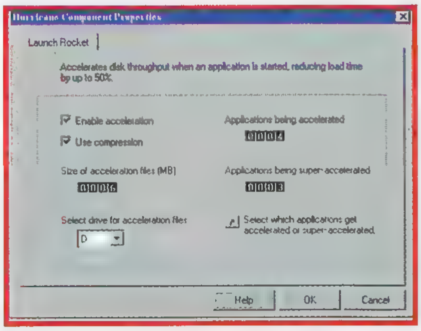
This component is installed and working properly.

All components and their statuses are found in a single dialog, where they can be added, removed, and modified.

Hurricane 98 is a suite of potent utilities that uses advanced caching algorithms to minimize hits to slower devices such as hard drives. They promise to enhance performance and ultimately deliver your machine from the hordes of sloth.

Your journey begins with Boot Rocket, a utility that preloads Windows into cache. Working in conjunction with a caching algorithm, it determines the best order to read files in order to speed up your boot times. And, yes, it works—this bat out of hell garnered the best improved boot times of all the utilities we tested.

Next up is Cache Compressor, which works in the background to increase the amount of Windows disk cache, thus delivering a larger cache of RAM for applications. This schema is also used in Launch Rocket, which creates a cache from memory to decrease the load times of frequently used apps. You're given complete control over which applications are affected, as well as the level of launch speed improvement (which effects the size of the cache created).


Hurricane Component Properties

Launch Rocket

Accelerates disk throughput when an application is started, reducing load time by up to 50%.

☑ Enable acceleration

☑ Use compression

Applications being accelerated: 0004

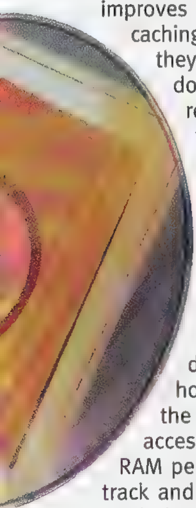
Size of acceleration files (MB): 0006

Applications being super-accelerated: 0003

Select drive for acceleration files: D

Select which applications get accelerated or super-accelerated.
Help
OK
Cancel

Each component offers configurable settings so you can make the best decisions.



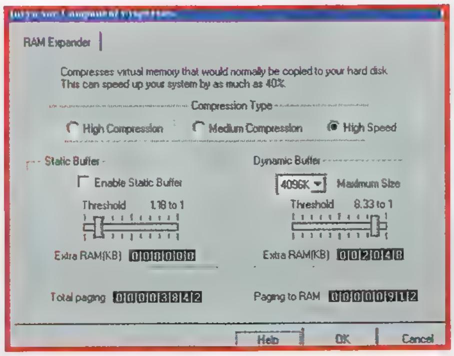
Reverse Cache improves 32-bit apps by caching them when they're closed down. When you relaunch one of these cached apps, your machine immediately opens it, as it's ready and waiting in memory. While launch times are dramatically reduced, you'll need 32MB minimum RAM.

Smart Read Ahead improves disk performance by predicting drive access patterns. It learns how you use your hard drive and the way apps and documents access it. Approximately 512KB of RAM per gig of hard disk is used to track and optimize hard drive hits. The read ahead on our test system had a 68% hit rate! This is great. The better the hit rate, the more the cache is being used, which means the slower hard drive suffers fewer calls.

Top-Down Cache speeds slower devices such as CD-ROMs and network connections by caching selective files onto local drives. RAM Expander compresses virtual memory to prevent writes into the Swap File region of your hard drive. It relies on two compression buffers: a dynamic buffer located in RAM and a static buffer that uses various unused regions of video RAM and the main system memory between the first 640K and 1MB that aren't directly accessible to apps.

Wouldn't it be cool to have a button that not only minimized an app but also suspended it in memory, discarding unneeded components and compressing the rest until needed? You get that with WinPack. And what about that critical first meg of memory? Global DOS Manager makes sure Windows doesn't place files such as DLLs and icons there, keeping the space available for more important files. It also opens upper memory regions (between 640K and 1MB) for apps created by the likes of Netroom, MemMaker, and QEMM.

RAM Drive creates a drive made out of, you guessed it, RAM. Complete with its own drive letter, this space is used for temp files, making copying a breeze for Setup apps and the like. Extended memory used by DOS drivers and TSRs is accelerated by the XMS Accelerator. And of course the PrintCache Manager spools print jobs to memory instead of your hard drive.


RAM Expander

Compresses virtual memory that would normally be copied to your hard disk. This can speed up your system by as much as 40%.

Compression Type: ○ High Compression ○ Medium Compression ● High Speed

Static Buffer

☐ Enable Static Buffer

Threshold 1.18 to 1

Extra RAM(KB) 000000

Dynamic Buffer

4096K Maximum Size

Threshold 8.33 to 1

Extra RAM(KB) 002048

Total paging 000003842

Paging to RAM 000000912

Although some settings seem advanced, the manual and interface explain each and give advice on settings.

Mode-Switch Accelerator speeds the transition between apps and the OS. Windows, you see, uses three distinct CPU modes: Ring 3 (for Windows apps), V86 (for DOS apps), and Ring 0 (for Windows Virtual Devices). Whenever a program requires services from DOS or whenever an interrupt occurs, the CPU transitions to another mode. This is called a Mode Switch and it happens tens of thousands of times each second. Mode-Switch Accelerator speeds up the process, reducing the number of mode switches needed overall.

All these "advanced caching algorithms" might come off like smoke and mirrors, but the numbers don't lie. Black magic or not, these utilities work as advertised and introduced no ill side-effects to our already taxed test PC. For example, using the WinPack utility with *Photoshop* freed up an additional 500K of memory. *Hurricane 98* also reduced the swap file from 22MB to 18MB. We found similar types of measurable improvements across the board.

If you're looking for a truly inspirational deal, look into *Nuts & Bolts* Deluxe. It incorporates *Hurricane 98* with four other apps: *Nuts & Bolts* (reviewed in *boot* 11) McAfee *Virus Scan Deluxe*, *Web Scan X*, and *Personal PGP*. All for only $60. Show up your pit-spawned brethren and rise through the ranks of the damned with this retinue of powerful utilities.

Price $40
Company Network Associates
Phone 408.988.3832
URL www.nai.com

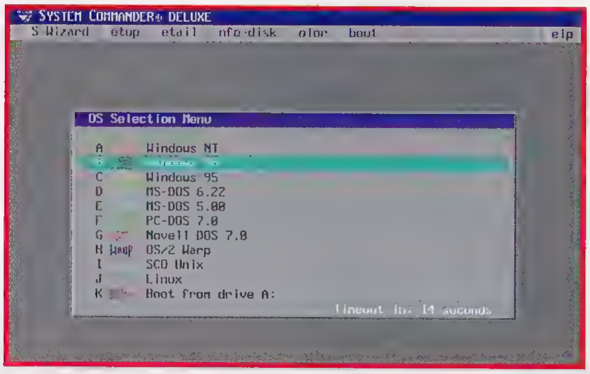
boot verdict 10

UTILITIES FOR

System Commander Deluxe

boot PICK '98! PRODUCT

Installing a second OS is like doing time in purgatory. If it goes well, you find yourself in heaven. If it goes wrong—as it usually does—you'll be ruing your day in hell. The PC wasn't designed with multiple OSes in mind, but *System Commander* makes the installation experience error free and easy.



Hefty OS support with wizard-style installations make this menu-driven app a breeze to run multiple systems.

The Deluxe version delivers a new Windows-like interface, additional tools, and mouse support that makes interface navigation a breeze.

The step-by-step OS Wizard expedites new OS installation without affecting existing system software. It takes into account idiosyncrasies such as Windows 95's habit of deleting current DOS files and replacing the Master Boot Record (MBR) during installation. The Deluxe version of *System Commander* also includes advanced features for converting partitions from FAT-16 to FAT-32 (and vice versa), and a log-file viewer makes tracking changes easy to understand for people who've yet to enter the land of hard drive demons. The manual includes sections that detail common OS installations, troubleshooting, and various tips and tricks.

When installed, *System Commander Deluxe* inserts and saves a new MBR. This record contains all the partition table information about the OSes you have installed. When you boot, your system BIOS loads the new MBR, which in turn loads *System Commander Deluxe* into memory, which in turn displays a menu allowing you to choose the OS you want to run. Pick an OS and *System Commander Deluxe* will do all the background work to load it. OS support includes almost every flavor of DOS (including multiple versions), Windows 95, 98, and NT (all versions), SCO Unix, OS/2 Warp, and Linux. You can also enable a security feature that locks out people without the correct user ID and password. Other options include a customizable OS menu, access tracking, and MBR options that seem to be left out of most new BIOSes.

Installing new operating systems shouldn't be like summoning Beelzebub. It should be as simple as summoning a minor demon. *System Commander Deluxe* provides this level of simplicity and the reassurance that your multiple-boot machine will never go awry.

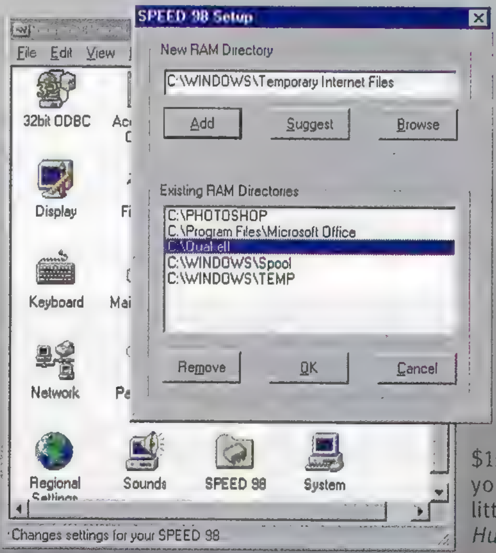
Price $70
Developer V Communications
Phone 408.965.4000
URL www.v-com.com

boot verdict 9

PC Speed 98

Your machine is not doomed to rot in hell's slowest labyrinths. It just needs a push. Adding more RAM will make a difference but won't increase the launch time of your apps, especially when using an older, decrepit hard drive. What you need is some intelligent software such as *PC Speed 98* to complement RAM usage. The software creates a virtual file system in memory—essentially a RAM drive that stores apps in memory for quicker access.

The canny scheme guarantees decreased load times, as the OS doesn't need to wait for transfers between the hard drive and RAM, a slow proposition, as we all know. By loading whole directories into this virtual file system, the system is able to free up 5% to 10% of system resources and use them to further speed up program execution. And of course the savings also increase the mechanical life and reliability of your hardware, while decreasing the battery wear on notebooks and portable computers.



New RAM Directory: C:\WINDOWS\Temporary Internet Files

Existing RAM Directories:
C:\PHOTOSHOP
C:\Program Files\Microsoft Office
C:\Dual.ell
C:\WINDOWS\Spool
C:\WINDOWS\TEMP

Changes settings for your SPEED 98

A simple interface launched via the control panel lets you choose the directories to PC Speed 98's virtual file system.

PC Speed 98 promises increased performance for any RAM configuration, but we found that we needed at least 32MB to realize any benefits. While we found that the utility didn't significantly improve application launching, we were impressed with actual usage performance—specifically in apps that leverage cache, such as database programs and Internet browsers. Web pages flew by like lightning as JPEGs and GIFs loaded from memory rather than disc.

Installation and setup were straightforward. The utility resides in the control panel, and the interface contains a browse button from which you choose the directories to accelerate. This would be a great little utility if it were priced around $15. For the money, however, you may want to look for a little more power—say *Hurricane 98*.

Price $39
Company Intelliquis
Phone 800.400.5203
URL www.intelliquis.com

boot verdict 7

Drive Image 2.0

Worried that your data isn't backed up properly? With *Drive Image 2.0*, you don't need to worry about banging your fists on the gates of hell. This DOS-based utility comes with everything you need to back up your data, clone your hard drive, or upgrade to a new one. A new graphical interface makes it easy to create an image of any partition and restore it to any other. Also, preloaded drivers for Iomega and Syquest drives means you can use removable devices for storage as well.

One cool new feature allows you to resize a partition on the fly prior to restoring data from a larger partition, all without the hassles of using the DOS-based Fdisk and Format utilities. Multiple levels of compression top out a whopping 50% compression ratio. At this level, we created an image of a 1.7GB partition in less than 30 minutes. This feat of magic was made possible by PowerQuest's SmartSector technology, which copies only used sectors, saving time and disk space. The slower alternative is to copy file-by-file (the government likes this method, as it allows the access of deleted files from a cloned drive). SmartSector technology supports FAT, FAT32, NTFS, and HPFS partitions.

The Drive Image Editor allows you to restore specific files, saving you the trouble of restoring an entire drive image when you need just 20MB. The only drawback is the inability to extract files from compressed archives. Images can also be split into smaller chunks and spanned over multiple low-capacity mobile disks.

ImageShield provides encryption and password protection. MagicMover helps move applications from one partition to another. DriveMapper helps you change the paths of applications that have moved—perfect for when you've thrown a drive image into a new partition.

The name says it all. If you need a quick, pain-free mirror, you've come to the right utility.

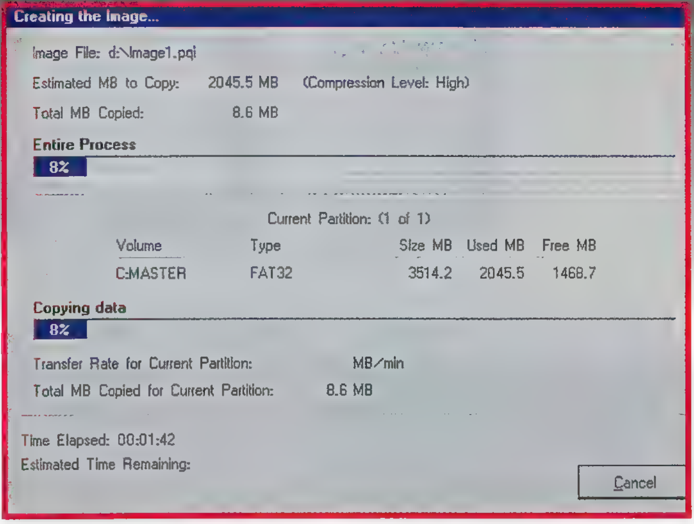


Image File: d:\Image1.pqi
Estimated MB to Copy: 2045.5 MB (Compression Level: High)
Total MB Copied: 8.6 MB

Current Partition: (1 of 1)

Volume	Type	Size MB	Used MB	Free MB
C:MASTER	FAT32	3514.2	2045.5	1468.7

Transfer Rate for Current Partition: MB/min
Total MB Copied for Current Partition: 8.6 MB

Time Elapsed: 00:01:42
Estimated Time Remaining:

A series of screens and checks make sure you choose the right data to be mirrored or copied, with most transfers taking only minutes.

Price $43
Developer n-Space Inc.
Publisher GT Interactive
Phone 800.610.4847
URL www.gtinteractive.com

boot verdict 9

The Saints and Sinners

Dare to Compare

Four utilities we reviewed promise to fix problems and improve performance—but can they help the most bedeviled of systems? Using Drive Image 2.0, we mirrored the hard drive in Executive Editor Jon Phillips's highly fragmented testing machine, a system stuffed to the brim with beta software. Of all the system environments in our office, this abused puppy had been running the same version of Win95 the longest and had suffered a number of incomplete uninstalls. We next installed the hard drive mirror in a base testing machine (120MHz Pentium II with 32MB RAM) and benchmarked it as our control system. We then ran each exorcism utility on the same control mirror and benchmarked them to see how well they found problems and improved performance. Once we completed all the benchmarks for one of the utilities, the original mirror was restored, putting the machine back to its bedeviled state for the next assessment.

	Control System	Norton Utilities v3.0	Quarterdeck RealHelp	Hurricane 98	PC Speed 98
Time to boot Machine (min:sec)	1:01	1:02	1:00	0:55	0:55
Time to launch Photoshop (min:sec)	0:17	0:06	0:17	0:07	0:13
Time to launch Word (min:sec)	0:09	0:05	0:09	0:05	0:07
Time to launch Quake II (min:sec)	0:13	0:12	0:21	0:11	0:17
System Resources while running multiple apps*	50%	53%	52%	52%	52%
Speed Disk (defrag) (hr:min)	2:25	2:07	2:25	N/A	N/A
Time to perform Surface Test (min:sec)	8:10	4:30	8:10	N/A	N/A
Invalid Shortcuts Found / Fixed	N/A	10 / 10	51 / 26	N/A	N/A
Registry Errors Found / Fixed	N/A	12 / 12	19 / 3	N/A	N/A

*Internet Explorer, Photoshop 4.0, Netscape Communicator 4.0, Word, Excel, PowerPoint, Internet Explorer, Eudora Pro, Quake II, Satori, Microsoft Outlook

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or call 1-800-272-ELSA.

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Product Information Number 139

Life After Death?

Six new motherboards try to resurrect the abandoned standard

Socket 7 is dead, right?
Wrong. Renegade motherboard manufacturers are resurrecting the square CPU socket that ruled supreme before Intel unleashed the oblong Slot 1 on a Pentium II–hungry public. The new Socket 7 motherboards aren't mere reproductions of vintage hardware, however. They come correct with new core-logic chipsets that support all the latest accoutrements: Accelerated Graphics Port, a 100MHz system bus, and 1MB of L2 cache, to name just a few of the features that once seemed to be the sole domain of Intel silicon.

If you have a Socket 7–compatible CPU burning a hole in your spare-parts pile—say, a Pentium 200MHz or even a new processor from AMD, Cyrix, or IDT—one of the new motherboards may be your platform for Pentium II–level performance at a cheaper price. Read on as we dig up the whole socket versus slot saga and review six new motherboards that promise to give you a high-performance alternative to the Intel juggernaut.

—Andrew Sanchez

ILLUSTRATION BY [illegible]

Life Before Slots

In the beginning, CPU replacement wasn't even an option. Many early x86 processors were soldered to the motherboard, forcing folks to buy a completely new board/CPU combo if they felt the upgrade itch.

As the rate of new processor releases picked up speed, gearheads demanded a quicker, easier way to remove and replace CPUs. Thus was born the multi-pin solderless socket. Early models required special tools for processor-plucking, but with the advent of 486s came the Zero Insertion Force socket. Consisting of a locking mechanism and handle, the ZIF was the ultimate solution for socket-based processors. With a flip of a handle, the CPU popped from the motherboard, fueling an upgrading frenzy that has yet to subside.

Before long, the socket architecture matured, through Socket 7 and Socket 8, for Intel Pentium and Pentium Pro CPUs, respectively. Competitors AMD and Cyrix, meanwhile, were gaining ground. Last year, in fact, AMD's K6 passed the Pentium in integer operations. But wouldn't you know it, Intel was working on a new processor and motherboard interface that would render the socket obsolete.

Intel says engineering requirements demanded that the CPU interface move from the industry-standard ZIF socket to the proprietary Single Edge Contact cartridge, which currently sits in the long, rectangular Slot 1. The SEC brought L2 cache onboard and increased L2 cache-to-CPU bus speed to half the core processor speed.

Socket 7 CPUs: New and Improved

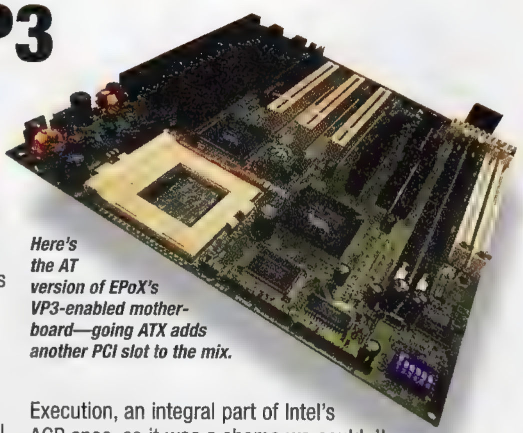
AMD, Cyrix, and Centaur are working on Socket 7–compatible processors that incorporate features that Intel said couldn't be supported by the old interface. AMD is going so far as to declare a "Super 7 Initiative," an industry-wide call to arms for bringing AGP, a 100MHz system bus, DDR SDRAM, and IEEE 1394 support to ye ol' ZIF. The AMD K6 3D (due out in May) and K6+3D (Q3 1998), will be at the forefront of this assault on Slot 1.

Armed with new instructions designed to accelerate floating-point computations—a must for speeding up 3D—these .25-micron processors also promise core speeds in the 300MHz+ realm, a 100MHz system bus, and the eventual arrival of on-chip L2 cache.

The Cyrix M-II (a.k.a. 6x86MX) will jump into the 100MHz-system-bus realm late this year. Further down the

AGP BOA

EPoX P55-VP3



Here's the AT version of EPoX's VP3-enabled motherboard—going ATX adds another PCI slot to the mix.

Among the first to embrace VIA's VP3 core-logic chipset, the P55-VP3 is an ATX board with one AGP slot, three PCI, two ISA, and a shared PCI/ISA. All I/O ports are located on the ATX I/O header connector. Three DIMM and two SIMM sockets get you to 384MB maximum system RAM. Curiously, EPoX opted for a conservative L2 cache of only 512K. For the AT-bound, EPoX offers its EP-5VP3A board (which gives identical performance minus one PCI slot).

The P55-VP3 handles all sorts of CPUs, including Pentium, K6, and 6x86-MX models from 100MHz to 333MHz. The board is easily configurable thanks to individual jumpers for CPU and voltage settings. While the EIDE header connectors are safely out of the way of full-length expansion-card action, the ZIF socket orientation is such that removal of a CPU's heatsink clip may knock off a capacitor. Be careful!

The P55-VP3 performed neck-and-neck with the VP3-based Tyan S1592S, practically mirroring it in every benchmark. But like the Tyan board, 3D benchmarks were hard to come by. The motherboard couldn't reliably run with the Real3D Starfighter, an AGP board based on Intel's i740 chipset. The system would work for about 10 seconds before locking up. This happened more often with non-Intel CPUs than with a P200MMX.

The i740 relies exclusively on Direct Memory Execution, an integral part of Intel's AGP spec, so it was a shame we couldn't get our rig to settle down long enough to get frame-rate scores. VIA assures us it's working on a fix that will make all the i740 pain disappear, but will VP3 users need patches for other AGP 2x videocards? If AGP 1x gets you goin', then more power to you. But don't even think about entering this realm with a brand-new 2x AGP videocard.

Price $105
Company EPoX
Phone 714.990.8858
URL www.epox.com

boot verdict 5

SOCKET 7 VS. SLOT 1...FIGHT!

Can a 233MHz Socket 7 CPU really go toe-to-toe with a Pentium II clocked at the same speed? We compared an AMD K6/VIA VP3 combo to a Pentium II/440LX combo and found the Intel parts whupped ass. Both systems were running 233MHz CPUs on a 66MHz system bus. Each had 512K L2 cache, though Pentium II cache is coupled to the processor itself, while the AMD draws its cache from silicon soldered to the motherboard. As you can see, the Socket 7 system didn't win a single race.

Test	Asus P2L97 Pentium II 233MHz	EPoX P55-VP3 AMD K6 233MHz
bootMark	113	91.7
DMA speed	54.2MB/sec	50.4MB/sec
MDK PerfTest	113	81
Quake II (DirectDraw)		
640x480	13.4fps	9.3fps
800x600	10.1fps	6.9fps
Final Reality AGP Texture Test		
12MB	46.41fps	23.5fps
20MB	39.64fps	21.76fps
Tex Murphy: Overseer		
640x480	18.6fps	15fps
ForsakenMark		
640x480	59.01fps	43.39fps
800x600	41.54fps	33.88fps

TEST SYSTEM: **Memory:** *64MB SDRAM* **O/S:** *Windows 95 OSR2 Build 1212b* **Hard drive:** *Quantum Fireball 1.2BG* **CD-ROM:** *Mitsumi FX12* **AGP Videocard:** *ATI All-In-Wonder Pro (3D Rage Pro AGP 2x)* **PCI Videocard for DMA speed test:** *Rendition V1000 Reference board*

RDS

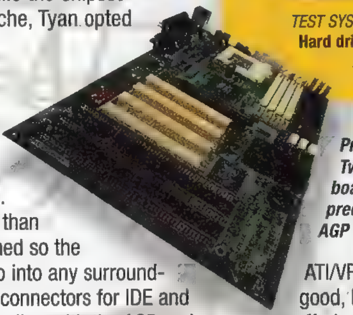
Tyan S1592S Trinity

Sporting VIA's VP3 AGPset, the S1592S Trinity represents Tyan's first outing with a non-Intel core-logic chipset.

This ATX board supports Pentium 100MHz to 233MHz, AMD K5 and K6 up to 266MHz, IDT C6, and Cyrix CPUs. Expansion slots include one AGP, three PCI, two ISA, and one PCI/ISA shared. USB, PS/2, and parallel ports are located on the ATX I/O header. With one more memory socket than EPoX's offering, three DIMMs and four SIMMs get you up to 1GB of total system memory (all cachable). While the chipset supports up to 2MB L2 cache, Tyan opted for a measly 512K.

In this age of software jumpers and single-jumper CPU and voltage settings, the seven jumpers for voltage and speed settings are extreme. Socket placement is better than EPoX's offering; it's positioned so the heatsink clamp won't bump into any surrounding capacitors. The header connectors for IDE and floppy drives, however, sit in line with the AGP and upper-most PCI slot, rendering full-length card placement a ribbon cable twistin' affair.

The S1592S Trinity almost mirrored the EPoX P55-VP3 board in practically every benchmark. Under the *Final Reality* AGP texture push, the ATI/VP3 combo pumped out 23.04fps—good, but not as fast as the SiS 5591 offering. But legacy DOS pixel pushing edged past the SiS 5591, and memory speeds were nimble.



Prepare to play a game of ribbon-cable Twister, as Tyan's S1592S Trinity board puts those header connectors precariously close to any full-length AGP or PCI slot.

Unfortunately, the S1592 Trinity suffers from the same i740-incompatibility itch that plagued the EPoX P55-VP3, resulting in lock-ups aplenty. We won't beat this transgression to death, but it's unforgivable that VIA didn't test its chipset more thoroughly before sending product out.

We don't blame Tyan or EPoX for VIA's infractions. But wouldn't it have been nice if everything worked correctly the first time around?

AGP BOARDS HEAD-TO-HEAD

	M-Tech AGP-R581A Mustang	Tyan S1592S Trinity	EPoX P55-VP3
bootMark	95.9	90.6	91.7
DMA speed	81.4MB/sec	50.3MB/sec	50.4MB/sec
MDK PerfTest	73	80	81
Quake II (DirectDraw)			
640x480	8.2fps	8.9fps	9.3fps
800x600	6.1fps	6.6fps	6.9fps
Final Reality AGP Texture Test			
12MB	38.53fps	23.04fps	23.5fps
20MB	24.79fps	21.22fps	21.76fps
Tex Murphy: Overseer			
640x480	13.0fps	15.0fps	15.0fps
ForsakenMark			
640x480	failed	42.9fps	43.39fps
800x600	failed	33.7fps	33.88fps

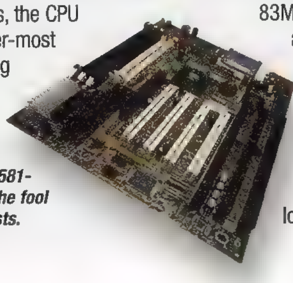
TEST SYSTEM: **CPU:** *AMD K6 233MHz* **Memory:** *64MB SDRAM (100MHz)* **O/S:** *Windows 95 OSR2 Build 1212b* **Hard drive:** *Quantum Fireball 1.2GB* **CD-ROM:** *Mitsumi FX12 AGP* **Videocard:** *ATI All-In-Wonder Pro (3D Rage Pro AGP 2x)*

Price $125
Company Tyan
Phone 408.956.8000
URL www.tyan.com

boot verdict 5

M-Tech AGP-R581A Mustang

The latest Socket 7 madreboard from M-Tech is an AT beauty that hides the SiS 5591 AGPset underneath a green heatsink. This board is armed with one AGP slot, three PCI, two ISA, and one shared PCI/ISA, although you'll have to block one of these slots if you opt for the PS/2 mouse connector or USB, and don't own an extended AT or server case. As with most AT boards, the CPU precludes the two lower-most PCI slots from accepting full-length cards. Other features include two serial ports and one parallel port, one floppy disk connector, an AT-style keyboard connector, and an IrDA connector.



We really dig M-Tech's R581- up until it began acting the fool with some of our D3D tests.

Three DIMM and two SIMM sockets get you to 256MB system RAM, but the chipset supports up to 768MB. A whopping 1MB of soldered-on L2 pipeline-burst cache straddles the AGP-R581A. Overclockers will find settings for 60, 66, 75, and 83MHz via jumpers, but SiS supposedly supports a 100MHz system bus.

Armed with ATI's 3D Rage Pro, the M-Tech AGP-R581A Mustang posted higher bootMark and *Final Reality* AGP texture benchmarking scores than the two VIA VP3-based boards we tested. But then the motherboard dumped hardcore on the ForsakenMark, locking up after about a minute into the 640x480 test. While 320x240 worked fine, bumping up the resolution to SVGA consistently locked the system. New drivers failed to solve the problem. While the board played the majority of D3D games just swell, occasional lock-ups continued throughout testing.

Of all the Socket 7 AGP boards, the R581A is the sweetest. But its AGP 2x action is tinged with the bitter aftertaste of incompatibility.

Price $125
Company M-Tech
Phone 408.441.8818
URL www.mtiusa.com

boot verdict 6

line is Cyrix's "Cayenne," which will pack accelerated floating-point processing and enhanced MMX execution units. Centaur is the dark horse. The next-generation C6+ will offer speeds exceeding 266MHz and eventually integrate 256K L2 cache—all at a cheap price.

So where's Intel in the Socket 7 landscape? The dusty 233MHz Pentium is the last in the desktop Socket 7 line. Word on the street is that all Pentium production will end in August 1998.

Can Socket 7 Compete?

New Socket 7–compatible core-logic chipsets boast support of the right features—AGP, a 100MHz system bus, larger amounts of L2 cache (see the *boot* 20 White Paper for full descriptions)—but in the face of Intel's mighty fabrication juggernaut, the upstarts will have trouble competing with the nearly ubiquitous Intel 440LX and 440BX chipsets.

During testing we found that some of the new Socket 7 core-logic chipsets don't support AGP 2x videocards as advertised. An ATI 3D Rage Pro–based card worked fine with VIA's VP3 core-logic chipset, but locked up intermittently when testing with the SiS 5591. Meanwhile, an Intel i740-based card wouldn't run with the VP3. VIA assures us the VP3 is a full AGP 2x part and is promising a driver update that will fix the i740 dilemma. But as AGP 2x products become more prolific, it'll be interesting to see how all the core chipset makers plan on tackling them. Will they need to release a driver revision for every new videocard?

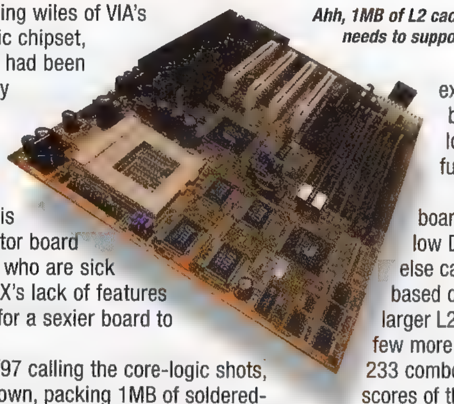
If you're not worried about AGP compliance, you can opt for VIA's VP2. Supporting up to 1MB of L2 cache, the chipset nailed scores that equal or better Intel 430TX performance.

Can the Socket Survive?

Holding the line at Socket 7 is a romantic prospect, but unless core-logic chipset makers release stable products that work out of the box, the technology is doomed. Yes, Intel's core-logic chipsets aren't perfect, but getting AGP 2x cards up and running should be a cake walk. As superfast Socket 7 CPUs are released, and as new Socket 7 core-logic chipsets support faster system buses and larger amounts of L2 cache, the Super 7 Initiative will challenge the performance specs currently offered by Pentium II and its slot architecture. Only time will tell whether the Socket 7 backers can fulfill their promises. For now, *boot* is unimpressed. b

PCI BOAR

FIC PA-2007



Ahh, 1MB of L2 cache. This is what the 430TX needs to support.

Under the beguiling wiles of VIA's VP2/97 core-logic chipset, the FIC PA-2007 had been a staple for many months before the advent of the AGP-enabled VIA VP3 chipsets. Still, this baby-AT formfactor board may excite folks who are sick of the Intel 430TX's lack of features and are looking for a sexier board to call home.

With the VP2/97 calling the core-logic shots, the FIC goes to town, packing 1MB of soldered-on L2 cache. Four SIMMs and two DIMMs add up to either 512MB of EDO/FP RAM or 256MB of SDRAM. The board supports Pentium MMX 166MHz to 233MHz, AMD K6 166MHz to 266MHz, and Cyrix 6x86MX PR166 to 200MHz.

Three PCI, two ISA, and one shared PCI/ISA slot complete the expansion-slot roll call, while header connectors for PS/2 and USB ports sit among the silicon. Unfortunately, the pesky nature of the AT formfactor dictates that some expansion slots will be partially blocked. In this case, the two lower PCI slots are robbed of full-length status.

On the performance tip, this board is tight. While it did exhibit a low DMA transfer rate, everything else came up fine, beating both SiS-based combatants in this roundup. The larger L2 cache helped in eking out a few more bootMarks, while the VP2/K6 233 combo posted the best frame-rate scores of the boards tested here.

While an extra PCI slot would have been nice, the FIC PA-2007 is a contender that's worth serious consideration.

Price *$143*
Company *FIC*
Phone *510.252.7777*
URL *www.fic.com.tw*

boot verdict 7

Socket 7 Primer

What's the Technology?
The motherboards in this article use various non-Intel core-logic chipsets to support both discontinued Socket 7 CPUs from Intel and existing and forthcoming Socket 7 CPUs from AMD, Cyrix, and Centaur. In practical terms, core-logic chipsets determine the family and speed of compatible CPUs, and the amount, type, and speed of accompanying memory. During actual use, core-logic chipsets control the flow of data among the CPU, memory, L2 cache, videocard, and storage devices. Read the White Paper on core-logic chipsets in boot *20.*

The Pentium 233MHz was the last Socket 7–compatible CPU from Intel. While Intel has moved on to Pentium II CPUs, which fit into proprietary elongated slots instead of industry-standard square sockets, its competitors are releasing new Socket 7 processors to keep the technology alive.

Why Upgrade?
The new motherboards—and all the parts you plug into them—aspire to offer Pentium II–caliber performance and up-to-date peripheral support for a friendlier price. The upgrade path is simple: Remove the Pentium-class CPU from your existing computer and plug it into a new motherboard that offers support for AGP, larger amounts of faster memory, larger amounts of L2 cache, and USB. A motherboard upgrade may be just the ticket if you have extra memory and an AGP videocard lying around.

Why Wait?
If you demand ultimate power and reliability, the latest crop of Socket 7 motherboards and CPUs won't pass your muster. The chart on page 50 clearly shows that Socket 7 technology can't compete with Pentium II technology in both raw system power and 3D gaming. What's more, we found some Socket 7 core-logic chipsets fail to support the AGP 2x spec as promised, resulting in system lock-ups.

Upcoming Socket 7 motherboards will offer larger amounts of L2 cache and support for faster processor speeds, both of which will help raw processing power. We also expect the AGP problems to be addressed. But for now we can say that while Socket 7 has risen from the dead, it's not ready to convert serious power users.

DS

PCI BOARDS HEAD-TO-HEAD

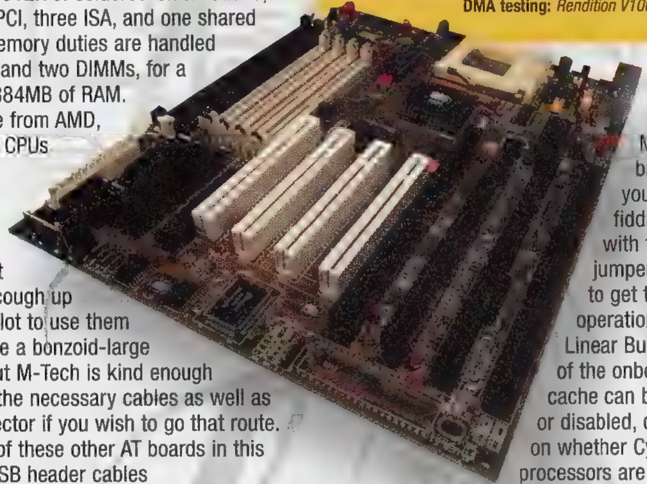
	M-Tech R547	FIC PA-2001	M-Tech R534
bootMark	92	96.7	87.8
DMA speed	67.2MB/sec	39.4MB/sec	64.8MB/sec
MDK PerfTest	77	80	78
Quake II (DirectDraw)			
640x480	9.0fps	9.5fps	7.3fps
800x600	6.6fps	7.0fps	5.6fps
ForsakenMark			
640x480	49.67fps	51.29fps	48.14fps
800x600	37.46fps	38.16fps	36.05fps

TEST SYSTEM **CPU:** *AMD K6 233MHz* **Memory:** *64MB SDRAM (100MHz)* **O/S:** *Windows 95 OSR2 Build 1212b* **Hard drive:** *Quantum Fireball 1.2GB* **CD-ROM:** *Mitsumi FX12* **PCI Videocard:** *ATI All-In-Wonder Pro (3D Rage Pro)* **PCI Videocard for DMA testing:** *Rendition V1000 reference board*

M-Tech Mustang R534F

First seen back in *boot* 12's "Pentium Killers" cover story, the R534F is especially popular with Cyrix users, who require the 75MHz system-bus speed demanded by their processors. This AT board, based on the SiS 5571 core-logic chipset, sports 512K of soldered-on L2 cache, and has three PCI, three ISA, and one shared PCI/ISA slot. Memory duties are handled by four SIMMs and two DIMMs, for a grand total of 384MB of RAM. You can choose from AMD, Intel, and Cyrix CPUs for this board. The R534F comes with PS/2 and USB connectors, but you'll need to cough up an expansion slot to use them unless you have a bonzoid-large server case. But M-Tech is kind enough to throw in all the necessary cables as well as the PS/2 connector if you wish to go that route. But, like most of these other AT boards in this roundup, the USB header cables are not included in the package. Jumper settings allow for system-bus speeds up to 83MHz, but like with its M-Tech brethren, you'll need to fiddle around with five jumper settings to get this board operational. Also, Linear Burst mode of the onboard L2 cache can be enabled or disabled, depending on whether Cyrix's processors are in use. Remember, the two lower-most PCI slots are blocked by the CPU, so forget about any full-length action down there. When it came time to benchmark, the R534 stumbled. We had problems getting the board to recognize a lone 64MB SDRAM DIMM, so if you plan on going that route, choose carefully. Unfortunately, performance was equally unfulfilling, posting the lowest scores among the trio of nouveau Socket 7 PCI boards we reviewed.

As an Intel 430TX killer, this board is a long way from fulfilling the dream, and with non-AGP chipsets from VIA outperforming it, there's not much this board has to offer.



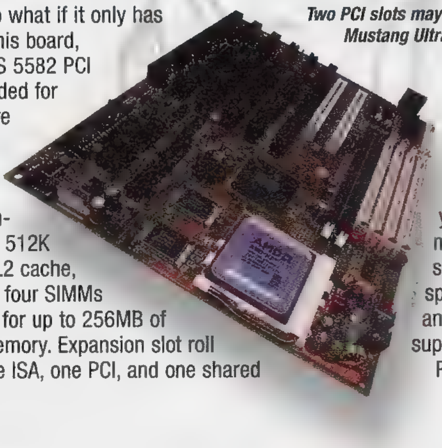
It supports all varieties of Socket 7 CPUs, but under close benchmarking scrutiny, the R534 lacks glitter.

Price *$150*
Company *M-Tech*
Phone *408.441.8818*
URL *www.mtiusa.com*

boot verdict 4

M-Tech Mustang Ultra-R547

Don't laugh—so what if it only has two PCI slots! This board, based on the SIS 5582 PCI chipset, is intended for folks who require mondo ISA slots for modems and whatnot. The AT form-factor R547 has 512K of soldered-on L2 cache, and comes with four SIMMs and two DIMMs for up to 256MB of main system memory. Expansion slot roll call includes five ISA, one PCI, and one shared PCI/ISA slot (stop laughing). All your favorite Socket 7 CPUs are supported, although the board doesn't come with a three-pin fan power connector, so check your current cooling situation to make sure you're good. Jumper settings allow for system-bus speeds up to 75MHz. You get USB and PS/2 header connectors, and support for Ultra DMA IDE devices. Performance-wise, the R547 didn't do badly at all, posting scores that would garner second-place among the boards we tested. But once again, the lack of enough PCI slots makes doing crazy-style PCI madness impossible, and this could be a problem. Different strokes for different folks, though, so if you're an ISA freak in need of telephony action, you may have found home.



Two PCI slots may not wiggle much wombat, but the Mustang Ultra-R547 does perform well.

Price *$135*
Company *M-Tech*
Phone *408.441.8818*
URL *www.mtiusa.com*

boot verdict 6

YOUR PERSONAL TECH **BRIEFING** ON THE **CONCEPTS** AND **COMPONENTS** THAT MAKE UP THE **PC** EXPERIENCE

this month:

The Windows Registry

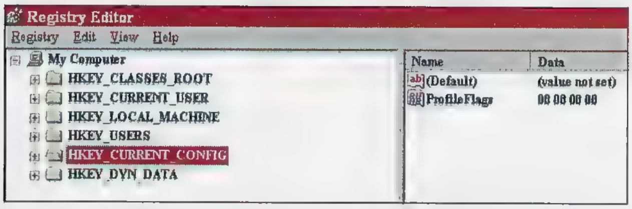
If a README file accompanied the Windows Registry, it would simply state, "Abandon hope all ye who enter." Entries numbering in the thousands have been stuffed, squeezed, and plopped into place by uncaring applications, games, utilities, and hardware drivers—with much of the data making sense only to the software that created it. The Registry is the final resting place for the damned, where circular references, dead-end links, and cryptic values litter the byways. Editing the Registry isn't for the weak of heart. Yet understanding the Registry yields the keys to complete Windows mastery.

—Sean Downey

Registry Basics

The Registry is the central database where all hardware details, software settings, and user preferences are stored. Whenever new hardware is detected and new software installed, or when changes are made to file associations or control panel settings, the Registry is updated. Configuration data is constantly refreshed to preserve Windows' complex settings.

The Win95 Registry physically resides in two files, SYSTEM.DAT and USER.DAT, which are located in your Windows directory and marked with hidden, system, and read-only attributes. The SYSTEM.DAT file holds global settings such as installed hardware resources. The USER.DAT file contains customized settings for such things as desktop preferences, individual application preferences, and network settings. If several user accounts are set up on the same system, a USER.DAT file is created for each user and stored in the Profiles folder in the Windows directory.



Name	Data
(Default)	(value not set)
ProfileFlags	00 00 00 00

Figure 1: RegEdit's Explorer-like interface lays out the main Registry tree on the left and the data contained in the currently opened key on the right, which in this case contains both string (top) and binary data types.

When viewed with the Registry Editor (REGEDIT.EXE), the glut of configuration data is displayed in a tree (similar to the way Explorer views your hard drive) under six subtrees (Figure 1). RegEdit has a dual-pane display with the keys and subtrees listed on the left and the value name and data contained within the currently opened key displayed on the right. Each key is limited to 64K and must have a default entry that often contains an empty string. Data types are limited to string or binary values, with the type indicated by the icons to the left of the name. Most hardware settings are stored as binary data, which is normally displayed as hexadecimal but may take the form of a dword (double-word), four-byte data sequence.

The Care and Feeding of Your Registry

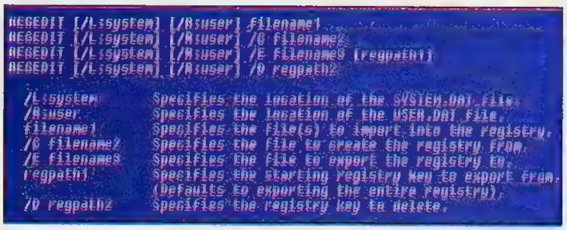
The Registry isn't altogether happy being mucked with, since an editing mistake can screw your OS and make it unbootable. Changes made through RegEdit are immediately implemented—there are no Save or Undo commands. Therefore, the first thing you should do before editing the Registry is copy your SYSTEM.DAT and USER.DAT files to a safe place. If your system gets hosed by a bad edit, you can always replace the corrupted DAT files with the clean ones.

Win95 does this itself by copying the SYSTEM.DAT and USER.DAT and naming them with a DAO extension each time the OS successfully loads. If Windows fails to load due to a corrupted Registry, the backup DAO files can be copied over bad DAT files. Booting into DOS and entering the following command-line sequence from your Windows directory will replace the Registry with the last successful system settings:

```
ATTRIB -H -R -S SYSTEM.DAT
ATTRIB -H -R -S SYSTEM.DAO
COPY SYSTEM.DAO SYSTEM.DAT
ATTRIB -H -R -S USER.DAT
ATTRIB -H -R -S USER.DAO
COPY USER.DAO USER.DAT
```

RegEdit can be used as a backup and restoration tool as well. It has an export option that can back up selected branches or the entire Registry and an import option that merges individual Registry files into the entire collective. The Registry files RegEdit manipulates are noted by their REG extensions. Be careful when working with these files, since double-clicking on them automatically merges them with the Registry. If the same keys already exist, the new contents will replace them. You can open and view REG files with a standard text editor such as Notepad to determine their contents before executing them.

RegEdit also has a command-line mode that can be used only from DOS (not a Win95 DOS prompt) to import and export Registry files. The parameters are listed in Figure 2.



```
REGEDIT [/L:system] [/R:user] filename1
REGEDIT [/L:system] [/R:user] /C filename2
REGEDIT [/L:system] [/R:user] /E filename3 [regpath1]
REGEDIT [/L:system] [/R:user] /D regpath2

  /L:system       Specifies the location of the SYSTEM.DAT file.
  /R:user         Specifies the location of the USER.DAT file.
  filename1       Specifies the file(s) to import into the registry.
  /C filename2    Specifies the file to create the registry from.
  /E filename3    Specifies the file to export the registry to.
  regpath1        Specifies the starting registry key to export from.
                  (Defaults to exporting the entire registry).
  /D regpath2     Specifies the registry key to delete.
```

Figure 2: RegEdit's DOS-mode command-line parameters provide a handy tool for Registry manipulation when you can't boot up Windows. Just be careful how you use the /C parameter because it replaces the entire Registry with the file specified.

If you screw up both your Registry files and their backup, don't lose hope. A file named SYSTEM.1ST, located in your Windows directory, contains all the system settings from when Win95 was first installed, and you can restore your system from it. Of course you'll spend a long time reconfiguring Windows if its been a while since your last installation.

Registry Structure

The six root keys that form the uppermost level of the Registry's hierarchy are handle keys (Hkeys), which help programs access resources. As noted in several of the Hkey descriptions below, Windows does a lot of shuffling around of Registry data as it loads. For a play-by-play schematic, see Figure 3.

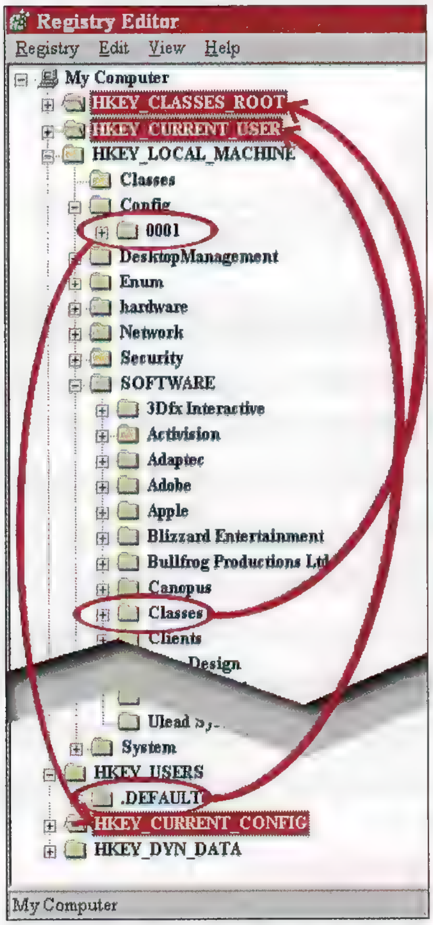

Registry Editor
Registry
Edit
View
Help
My Computer
HKEY_CLASSES_ROOT
HKEY_CURRENT_USER
HKEY_LOCAL_MACHINE
Classes
Config
0001
DesktopManagement
Enum
hardware
Network
Security
SOFTWARE
3Dfx Interactive
Activision
Adaptec
Adobe
Apple
Blizzard Entertainment
Bullfrog Productions Ltd
Canopus
Classes
Clients
Design
Ulead Sy...
System
HKEY_USERS
.DEFAULT
HKEY_CURRENT_CONFIG
HKEY_DYN_DATA
My Computer

Figure 3: Every time Win95 boots it creates new pointers to vital Registry data subtrees.

Hkey_Classes_Root tells Windows how to deal with the internal file formats of the registered file types installed on your system. This includes information about file extension and file application associations, so that when you double-click on a file, Windows knows what program to run. In Hkey_Classes_Root, Windows finds out how to open each file type and the icons associated with them, as well as individual software settings for drag-and-drop operations and context menus. The Hkey_Classes_Root subtree is actually a pointer to the data located in the Hkey_Local_Machine\Software\Classes subtree to provide easy access to this information and backward compatibility with Win 3.x programs. Applications register their file types by writing the info to the Hkey_Classes_Root subtree, and this data is automatically updated in Hkey_Local_Machine\Software\Classes.

Hkey_Current_User contains all the settings for the currently logged-on user. This includes system sounds, Start menu programs, keyboard layout, network settings, software configurations, and control panel settings. Through separate user profiles, one user can custom configure their apps and have their preferences restored each time they log onto the computer.

Hkey_Local_Machine holds everything stored in the SYSTEM.DAT file. This is where you'll find a list of all hardware devices installed, their associated device drivers and settings, as well as global software settings for the OS and installed apps.

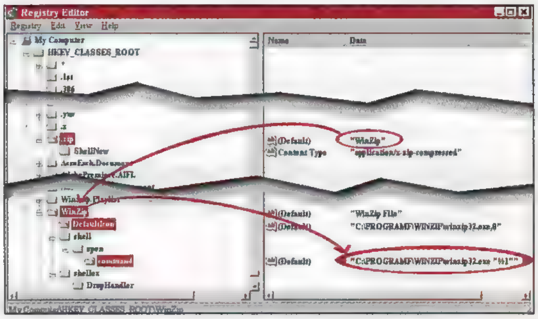
Hkey_Users consists of all the user information stored in the USER.DAT file. If there is only one user, the Default subtree is used. New personal profiles are made when a new user logs on and chooses to retain all their personal settings. If you'd like everyone to always use the settings in the .Default subtree, turn off the customized preferences option in the Passwords control panel under User Profiles.

Hkey_Current_Config points to the current hardware configuration detected at startup and is specified in the Hkey_Local_Machine\Config subtree. Unless multiple hardware profiles are created, as is the case for most notebooks and docking stations, the hardware configuration this subtree points to is always the same.

Hkey_Dyn_Data is cooked up fresh every time Win95 opens. Dynamic status info polled from various Plug-n-Play devices is stored in your system's RAM and continuously updated in this subtree. The Hkey_Dyn_Data subtree also stores all the dynamic links to the performance statistics displayed by Win95's system monitor and resource meter.

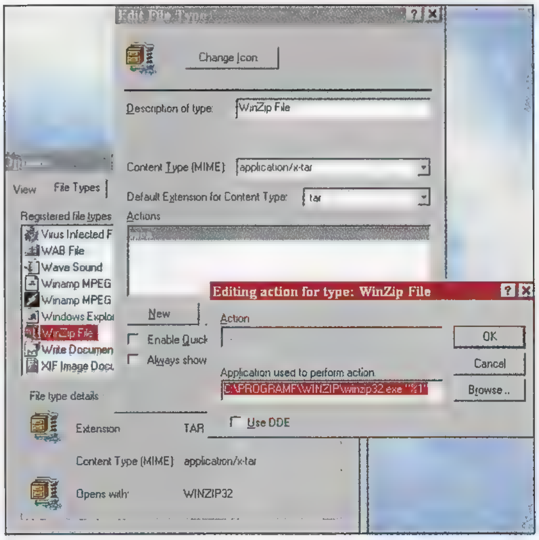
Hkey_Class_Root Explained

In general, two types of keys make up the contents of Hkey_Class_Root: filename extension keys, which indicate a file's class definition, and class definition keys, which specify the form specific actions take on a defined class of files. Figure 4 shows the relationship between these two keys. Another way of viewing this information is found in Explorer's View menu by selecting Options and choosing the File


Registry Editor
Registry
Edit
View
Help
My Computer
HKEY_CLASSES_ROOT
*
.lst
.386
.yw
.z
.zip
ShellNew
AcroExch.Document
AdobePremiere.AIFL
WinAmp.Playlist
WinZip
DefaultIcon
shell
open
command
shellex
DropHandler
Name
Data
My Computer\HKEY_CLASSES_ROOT\WinZip

(Default) "WinZip"
Content Type "application/x-zip-compressed"
(Default) "WinZip File"
(Default) "C:\PROGRAMF\WINZIP\winzip32.exe,0"
(Default) "C:\PROGRAMF\WINZIP\winzip32.exe "%1""

Figure 4: This amalgamation of several RegEdit screens shows how file types relate to class definitions. Figure 5 shows how Win95 provides easier access to this same information.


Edit File Type
? ×
Change Icon
View
File Types
Registered file types
Virus Infected F
WAB File
Wave Sound
Winamp MPEG
Winamp MPEG
Windows Explor
WinZip File
Write Documen
XIF Image Doc
Actions
New
Editing action for type: WinZip File
OK
Cancel
Browse..

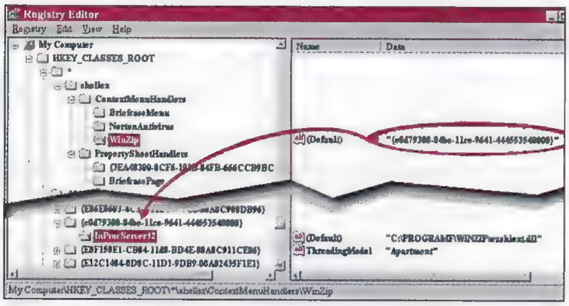
Description of type: WinZip File
Content Type (MIME): application/x-tar
Default Extension for Content Type: tar
☐ Enable Quick
☐ Always show
Action:
Application used to perform action: C:\PROGRAMF\WINZIP\winzip32.exe "%1"
☐ Use DDE
File type details
Extension TAR
Content Type (MIME) application/x-tar
Opens with: WINZIP32

Figure 5: The Edit File Type option that be accessed through Explorer's View menu is a handy place to manipulate much of the same data found under the Hkey_Classes_Root subtree.

Types tab. Figure 5 shows the same information, but in a more accessible format. If a filename extension isn't specified in Hkey_Classes_Root, Windows refers it to the Unknown class definition key, which instructs the OS to bring up the Open With dialogue box.

Opening up the Hkey_Class_Root subtree reveals a long list of filename extensions, one key for every file type installed on your system. The Shell, Shellex, and ShellNew keys within the filename extension entries are used to define how the Win95 shell handles files with that extension. If none of the shell keys are present, associated actions are defined in the extension's class definition. The Shell key specifies standard actions such as Edit, Open, and Print, and the Shellex key adds new shell features (such as the Empty Recycle Bin context menu option) not available as standard file actions. The ShellNew key adds the file type to the New option in the desktop context menu, allowing new files with that extension to be created by right-clicking on the desktop.

The first filename extension listed is the asterisk (*) key, and the data stored here is applied to all files. As can be seen in Figure 6, three keys are listed under the Shellex\ContextMenuHandler subtree. The first key, BriefcaseMenu, is used by Win95 to add an update option to the context menu of any file located in the briefcase. The other two keys have been added by installed software. The string data located in these keys is a 128-bit class ID (CLSID) for shell extension DLLs and other OLE component objects. Figure 8 lists some common CLSID's. In this case, it serves as a flag for WinZip's "Add to Zip" addition to each file's context menu (shown in Figure 7).



(Default) "{e0d79300-84be-11ce-9641-444553540000}"

{e0d79300-84be-11ce-9641-444553540000}

{E0F150E1-CB04-11d0-BD4E-00A0C911CE86}

{E12C1464-8D8C-11D1-9DB9-00A02435F1E1}

(Default) "C:\PROGRAMF\WINZIP\wzshlext.dll"

ThreadingModel "Apartment"

My Computer\HKEY_CLASSES_ROOT*\shellex\ContextMenuHandlers\WinZip

Figure 6: The Add to Zip command added to the Context Menu of every file is a function of the DLL file that's referenced under WinZip's CLSID number.

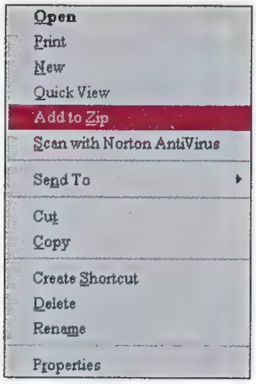
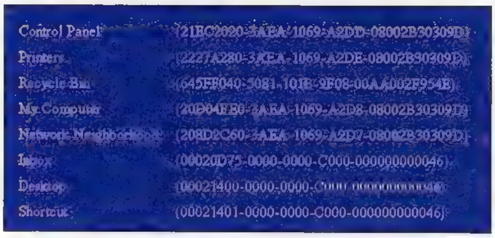


Figure 7: WinZip adds a new command to every file's Context Menu allowing right-click access to file compression.



Control Panel	{21EC2020-3AEA-1069-A2DD-08002B30309D}
Printers	{2227A280-3AEA-1069-A2DE-08002B30309D}
Recycle Bin	{645FF040-5081-101B-9F08-00AA002F954E}
My Computer	{20D04FE0-3AEA-1069-A2D8-08002B30309D}
Network Neighborhood	{208D2C60-3AEA-1069-A2D7-08002B30309D}
Inbox	{00020D75-0000-0000-C000-000000000046}
Desktop	{00021400-0000-0000-C000-000000000046}
Shortcut	{00021401-0000-0000-C000-000000000046}

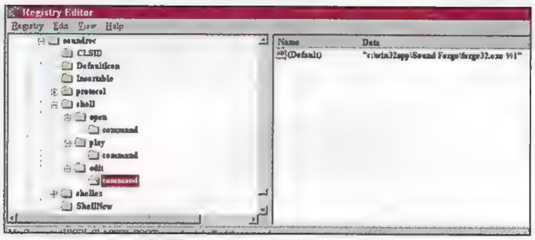
Figure 8: These common class ID numbers can be used to add active links to such things as the control panel, My Computer, printers, disk drives, and dial-up networking folders from your Start menu or desktop.

The Folder key works the same way for folders as the asterisk does for files. A useful hack to this key makes all folder windows, including My Computer, the Recycle Bin, and Network Neighborhood, open in Explorer instead of the normal "My Computer" view. Just open the Hkey_Classes_Root\Folder\Shell key and change the data in the default entry from an empty string to "Explore". This alters the default context menu option to Explore instead of Open.

The class definition for control panel applets can be used to bypass the necessity of opening the control panel by changing the default setting under the Hkey_Classes_Root\cplfile\shell key from cplopen to open. You can now run the applets from the Start menu's Run option. Figure 10 is a list of control panel CPL filenames to try out.

Editing a class definition's command key allows you to change its associated application or just alter the way they're opened or played. If you use a sound editor such as Sound Forge a lot, you may want to add an edit option to the Soundrec class definition that governs all WAV files. Just open the Hkey_Classes_Root\Soundrec\shell key and add a new key with the Edit menu. Name this key Edit and enter in a key value of "Edit". Then add a subkey named "Command" where you'll enter the command line for Sound Forge as its value. The "%1" at the end of the command in Figure 9 passes the selected filename to the app, allowing it to open automatically.

If you have more aesthetic concerns, you can use RegEdit to change the icons associated with a specific file type by editing the DefaultIcon entry. You can change your default text editor from Notepad to Wordpad by changing the command listed under the textfile\shell\open and print keys. Or you can also make MediaPlayer remain open after playing a file by removing the /close parameter from the end of the command line found in the Hkey_Classes_Root\mplayer\play\command key. These are just a few examples you can apply when editing other Registry keys.



(Default) "c:\win32app\Sound Forge\forge32.exe %1"

Figure 9: This sample Registry hack adds right-click access to Sound Forge's editing capabilities to all WAV files.

Control Panel Applct	CPL file name
Display	DESK.CPL
Regional Settings	INTL.CPL
Mouse	MAIN.CPL
System	SYSDM.CPL
Date and Time	TIMEDATE.CPL
Multimedia	MMSYS.CPL
Modem	MODEM.CPL
Network	NETCPL.CPL
Passwords	PASSWORD.CPL
Internet	INETCPL.CPL
32-bit ODBC	ODBCCP32.CPL
Tweak UI	TWEAKUI.CPL
Desktop Themes	THEMES.CPL
Find Fast	FINDFAST.CPL
DirectX	DIRECTX.CPL
Add/Remove Programs	APPWIZ.CPL
Game Controllers	JOY.CPL
Accessibility	ACCESS.CPL

Figure 10

Keep Digging

There is no official support from Microsoft for hacking the Registry—it's akin to resoldering your motherboard. Don't let that stop you from digging, however. There are many ways to tweak your Windows configuration without wading hip-deep into the illogically scattered debris that is the Registry, but sometimes there just isn't any substitute for getting your hands dirty. ■

12 STEP CLINIC

IRQS ACTING UP? VIDEO **DRIVERS** GETTING YOU **DOWN**? 3D CARDS HAVE YOU CAUGHT IN A **CONUNDRUM**? BOOT **EDITORS** ANSWER YOUR TOUGHEST **PC QUESTIONS**.

Dual Booties

Can you tell me how to dual boot Win3.1 and Win95 OSR2.0 using FAT32 on the same drive?

Patrick K. Carson

***Technical Editor Sean Cleveland replies:** Win3.1 won't run in FAT32—you have to install it on a FAT16 partition using an older version of DOS (6.22 is the newest that supports it). DOS 6.22 can't be run on a FAT32 partition either. If you decide to do this (and I don't know why you would), you can enable dual booting by adding the line*

```
BootMulti=1
```

to the [Options] section of MSDOS.SYS, located on the root of your C:\ drive. To display the menu every time you boot automatically, add the line

```
BootMenu=1
```

or, alternatively, hit F8 when you boot to bring up the boot menu. The MSDOS.SYS file is write-protected, so you'll have to remove the read-only attribute first (type: attrib –r mdos.sys*). Good luck!*

"Is it really necessary to update the TX chipset drivers?"

If It Ain't Broke...

I'm wondering whether it's really necessary to update the TX chipset drivers you talked about in *boot* 18. Is there any real advantage for replacing the default INF driver? All the components work flawlessly together, so it is with some hesitation I install the new driver, risking messing things up.

Anthony Famiglietti

***Technical Editor Sean Cleveland replies:** You only really need to replace it if you're running or plan to use an Ultra DMA hard drive. To properly use one, you have to be running the Intel 82371AB PCI IDE controller, which this utility provides. Further info can be had from Intel's web site at* **developer.intel.com/design/pcisets/busmastr/bmfaq.htm#faq4b**. *Sure, you don't need to do this, as an Ultra DMA drive will work just fine on an older EIDE bus, but the bursts you get from a fully supported UDMA system are well worth it.*

32x To 2x In Six Seconds

I have an NEC 14x/32x CD-ROM. My question pertains to digital audio extraction. If a CD-ROM can grab data from a data CD at 14x/32x, why is it restricted to a lousy 2x for grabbing raw audio data?

Alkivar

Technical Editor Sean Cleveland replies:** You should be able to grab RedBook Audio (CD music data) at a much faster rate than that. I can't say for sure, as we have yet to test that particular drive, but we will. Anyway, it may have to do with the software that you're using. Try* CD-DA Extractor *(www.evitech.fi/~jukkatp/cdda/***).*

Deux SCSI?

I just bought an Iomega Buz and want to know if it's possible to have two SCSI controllers in one machine. I can't disable the onboard SCSI and want to use the Ultra Wide SCSI that came with the Buz.

Bobby

***Technical Editor Sean Cleveland replies:** We need more information. Always send in motherboard and card manufacturers, product numbers, and the exact nature of the problem. An onboard SCSI can be disabled in the BIOS—switch into this by hitting the <Delete>, <F1>, or <F2> key at boot. If it's not there, check your manual or go to your motherboard manufacturer's web site to find out where the jumper that disables it is located. They may also have a BIOS upgrade that adds disabling functionality. It's possible to have two SCSI controllers in your machine. If you have the room, try running both—they just require different memory and IRQ settings.*

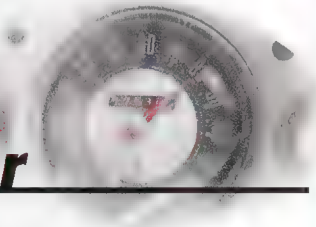
And What Is Fonzie Like?

Can you guys recommend an effective way to cool a hard drive? I have a shiny new Quantum Atlas II, which shakes its booty at 7,200 RPM—I like the jet engine sound it makes, but I could cook an egg on its surface. It's a full-size 3.5-inch drive, so it takes up the entire bay it sits in: Even if a heatsink that big existed, it wouldn't fit between the drive and the roof of my case.

Matthew Sakey

***Technical Editor Sean Cleveland replies:** Get an external fan, preferably one at least three inches in diameter, and mount it in your case, pointing at the drive. Ingenuity here is important because older cases don't come with cooling in mind. We have heard that pointing a fan directly at the drive may blow dust particles at it. This may be true of older drives, but newer ones are completely sealed. I've been pointing fans at my drives for years and have never had a drive fail.*

Overclocker's Corner



Overclock Issues

How do I overclock my 200MMX on a Tyan S1570 AT motherboard? It has a 430TX chipset. Can it be done at all?

Alex Montenegro

***Senior Editor Andrew Sanchez responds:** According to Tyan, the board you have does support 233MHz. Try setting your board as if you were installing a Pentium 100MHz, which would be:*

JP10=OFF
JP11=OFF
JP13=1-2

Because the TX BIOS autodetects the type of CPU you use, the voltages will be set automatically. Other than the CPU jumper settings, there are no other settings required to operate at 233MHz. But, since you own a 200MHz CPU and the mainboard only has system-bus speeds of 66MHz, the BIOS will most likely set itself up to 100MHz, but you are more than welcome to try it to see if it works. If, after the jumpering, it POSTs and you see the BIOS telling you there's a 100MHz CPU installed, then you're ass-out.

Yet Another

Yes, another overclocking question. I own a Pentium II 300MHz, Asus P2L97 mainboard. I am overclocking the bus at 75MHz now. I would like to get it to the next level, but it ran at 150MHz when I set the frequency ratio at 5.0x. I then tried to up the bus to 83MHz. It hung up on the screen that says updating DMI just before it says starting Win95.

Ason Saddler

***Senior Editor Andrew Sanchez responds:** Since I don't know what other hardware you're running, I can't say for sure. But there's a high probability that one or more of your PCI devices may not be digging the higher system bus. Remember, when you overclock your system-bus speed, you're also overclocking your PCI bus: at 75MHz, your PCI bus is steaming along at 37.5MHz; at 83MHz, that ol' PCI bus is sweating at 41.5MHz. So, some devices may not dig running at these higher PCI speeds. Also, check to be sure what type of RAM you have. The memory you own must be able to run at these higher speeds; most 66MHz DRAM modules should allow this. Check your memory specs.*

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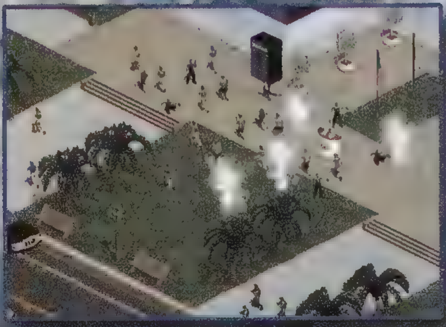

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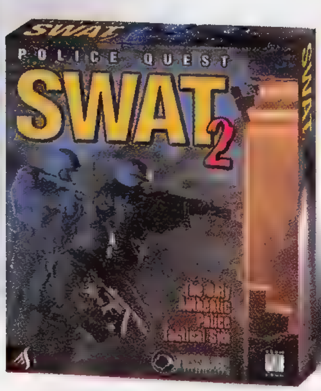

For more information, check out www.sierra.com and www.swat2.com

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WON
www.won.net

Product Information Number 312

PRIN

EACH MONTH, **BOOT** EDITORS GATHER THE **BEST** PRODUCTS IN A SPECIFIC **CATEGORY** AND DEEM THEM: **BOOTWORTHY**

You ignore it. You let dust collect in the paper guides, and stack your books and CDs on top of it. You don't care if you put recycled paper in it the wrong way anymore, and the ink is probably thicker than molasses. Face it… you've lost that loving feeling for your printer, baby.

It may not have the pure sex appeal of the latest 3D accelerator, and you probably can't overclock it, but regardless, it's still skanky when you give your friends a badly bleeding printout that's been dithered to hell and back.

Here's a group of bootWorthy printers that'll put the lust back into your heart and have you lovingly hitting Ctrl-P once again.

Tektronix **Phaser 560**

Print Mechanism: Laser

When it comes to quality, nothing beats a good color laser. Reproducing plain text, grayscale images, or color photographs is a tricky business, but the Phaser 560 gives one boffo performance.

The Phaser 560 is jammed with features for both consumer and workgroup/network audiences. A 33MHz RISC controller, augmented by 48MB of onboard RAM, delivers genuine Adobe PostScript processing. The Phaser 560 supports four paper trays, and with a toner capacity twice that of standard laser printers, it prints up to 10,000 color pages or 12,000 monochrome pages before those cartridges will need replacing. Tektronix claims speeds of 5ppm for color and 14ppm for black and white, and per-page costs of $0.08 and $0.02, respectively.

At 1200dpi, the Phaser 560 easily conjures photographic quality. Grayscale reproduction is just as eye-popping, with crisp edges and clean output. Pixelation also magically disappears.

Inside, the Phaser 560 proves itself to be one smart cookie. It has built-in automatic color correction, intelligently selects paper trays, and will let you monitor toner levels via a graphical gas gauge on the front panel or directly from a web browser. You can also adjust the settings to perform customized color matching or simulate standard Pantones. Network support is optional.

product info

Price $4,995
Company Tektronix
Phone 800.835.6100
URL www.tek.com

A WIDE VARIETY OF MEDIA—TRANSPARENCIES, ENVELOPES, LEGAL AND LETTER-SIZED PAPER, AND GLOSSY STOCK—ARE ALSO SUPPORTED.

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12pt: The vene
data corruption and back
bootEditors have turned
delivered without flinchi
service of data recovery,
10pt: We begin with Disk
record, and file and directory
errors—just like Windows Sc
selective surface checks (for j
allocation tables, partition tab
8pt: On our test machine, Disk

Colors are brilliant and images have smooth gradients and minor dithering. Text is just as good—sharp, smooth, and with thick black lines.

TERS

DUAL PAPER FEEDS KEEP THE EPSON HUMMING WITH FULL-BLEEDING FUN.

Epson **Stylus Color 3000**

Print Mechanism: Inkjet

While it won't produce large-format prints like the HP, it'll still save you $10,000 and let you print near full-bleed 13-inch-by-19-inch color output.

What's full bleed? It's the wall-to-wall carpeting of the printer world. The Color 3000 will print borders down to a twelfth of an inch on the top, left, and right borders and .54 of an inch on the bottom border.

While 13-by-19 won't get you a billboard, it'll let you print your own newspaper-sized A-2 output. The Color 3000 will also take a roll of paper for continuous printing.

Epson again uses its proprietary Micro Piezo in the Color 3000. Instead of heating ink before spraying it like other printers, Micro Piezo heads use electromechanical pressure to carefully spray the ink onto the paper. By leaving the heat out of the formula, Epson can choose from a wider range of inks to use.

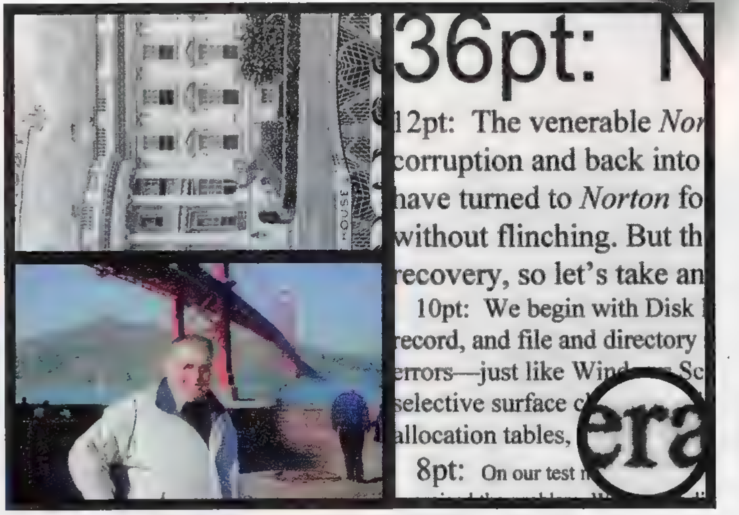
A CYMK printer, the Color 3000 is rated for speeds of 7ppm in both monochrome and color on letter-sized paper. Epson also squeezes Adobe PostScript Level 2 support into the box, but you wouldn't expect less with a printer of this caliber. Maximum DPI is 1440x720.

Using Epson's glossy photo-grade paper, the 3000 spit out some of the best output in this roundup, surpassing the HP and coming close to the Tektronix. The software bundle is nonexistent, as it is on the HP and other printers in this roundup. We guess you won't need *Photo Express* or *Photoshop LE* if you're going to plunk down $2K or $12K on a printer.

Epson provides driver support for Windows 3.x/95 and NT 3.5 and 4.0, as well as Macintosh 7.x and up. I/O is left to a Centronics. The 3000 can be slaved to a network with either Ethernet or LocalTalk options.

product info

Price $1,999
Company Epson
Phone 800.463.7766
URL www.epson.com

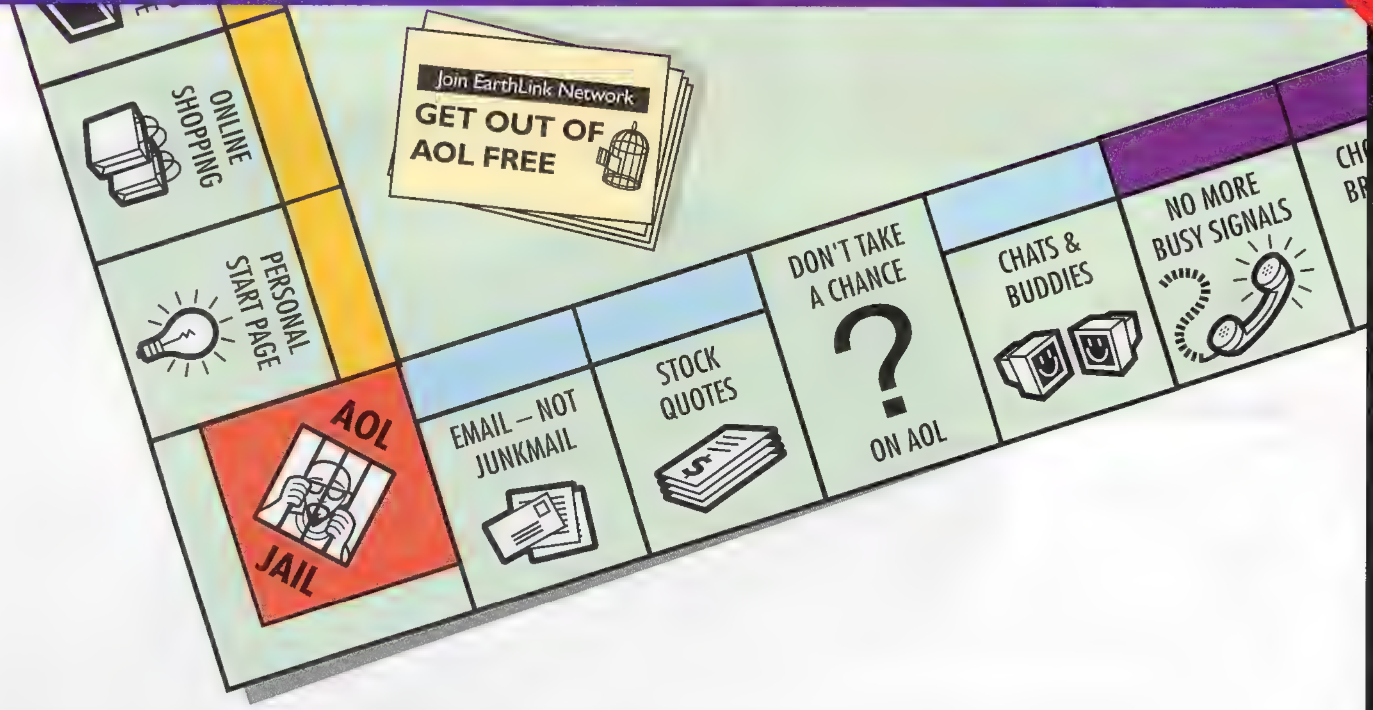


36pt: N
12pt: The venerable *Nor*
corruption and back into
have turned to *Norton* fo
without flinching. But th
recovery, so let's take an
10pt: We begin with Disk
record, and file and directory
errors—just like Wind Sc
selective surface c
allocation tables,
8pt: On our test

Remember: Counterfeiting is illegal, especially with 1440x720 resolution.

Software Included on the Boot CD-ROM

Tired of waiting for your turn to get on the Internet?


ONLINE SHOPPING
PERSONAL START PAGE
Join EarthLink Network
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AOL JAIL
EMAIL – NOT JUNKMAIL
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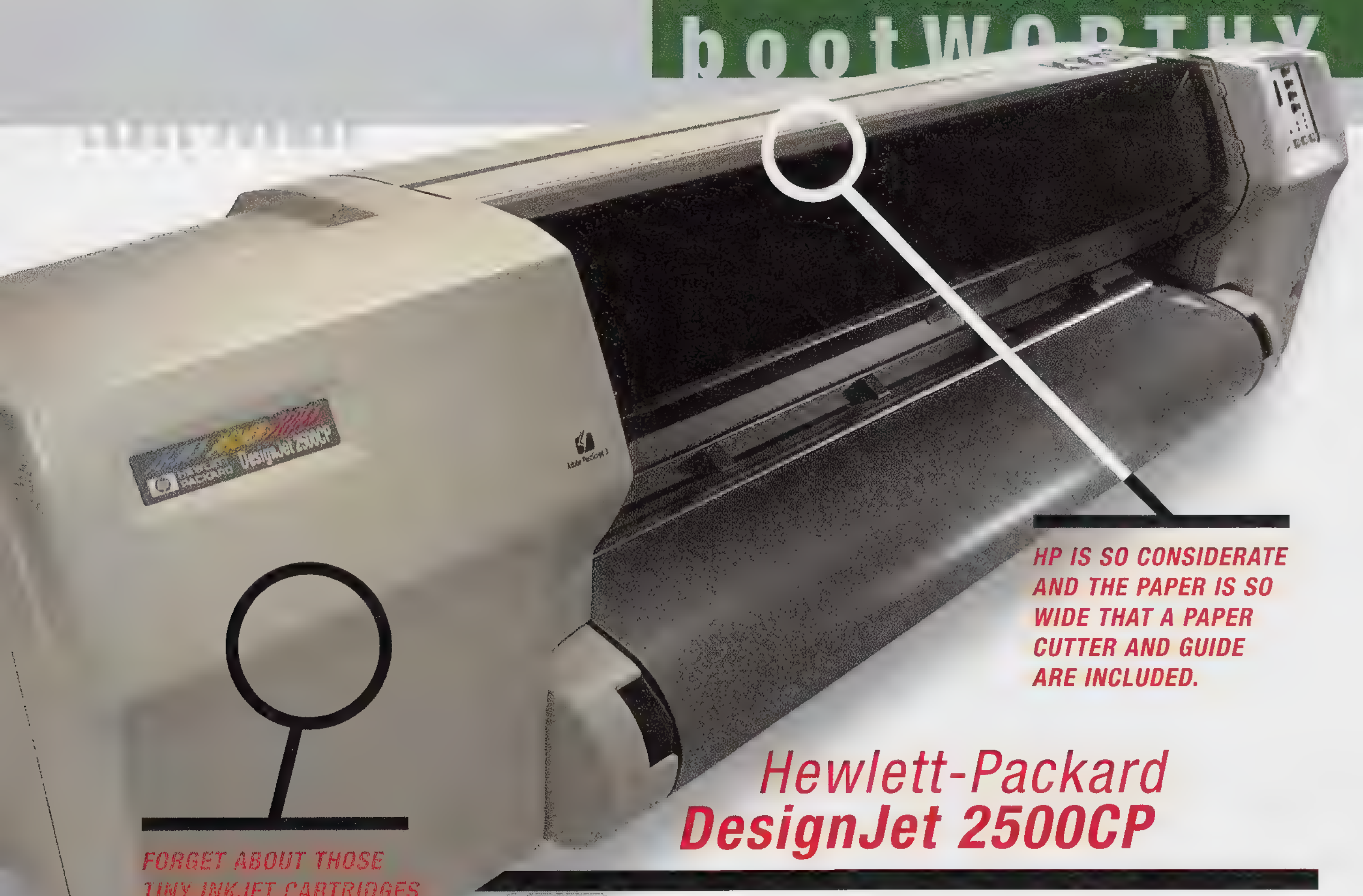


HP IS SO CONSIDERATE AND THE PAPER IS SO WIDE THAT A PAPER CUTTER AND GUIDE ARE INCLUDED.

FORGET ABOUT THOSE TINY INKJET CARTRIDGES YOU HAVE TO CHANGE WEEKLY. SLIP IN FOUR 440ML CONTAINERS OF DYE AND THE INKHEADS WILL SALLY OVER TO FILL UP DURING PRINT JOBS.

Hewlett-Packard DesignJet 2500CP

Print Mechanism: Inkjet

You know you're in for some lovin' when the printer shows up in a box bigger than a Yugo. OK, so maybe you can't put it on your desktop or move it without the help of union labor, but who cares? With this beast you'll be the envy of every artist and photographer in your building. And when you call for technical support, HP literally sends folks to your doorstep. How's that for power?

The DesignJet 2500CP outputs near photo-realistic images on rolls of paper 3-feet wide and 150-feet long. You can also feed it media in sheets as well. Heck, this baby should've come with its own version of *PrintShop Deluxe: The Billboard Edition.*

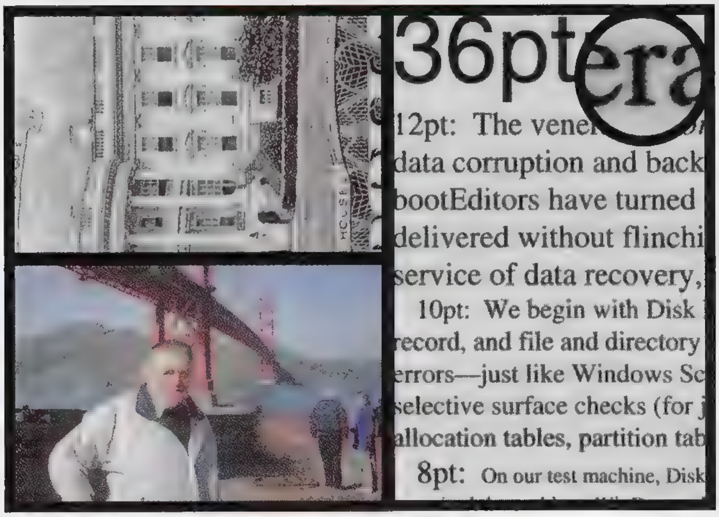
We're not kidding about making billboards either. With 3M's MCS film and the UV ink, your pirate billboards could last 18 to 24 months without fading outdoors.

A CYMK printer, the DesignJet 2500CP prints images in 16.7 million colors at a true 600x600dpi. And you don't have to worry about running out of ink mid-roll either: The four ink reservoirs each hold more than a Coke can's worth of dye, supposedly enough for 400 2-feet-by-3-feet prints or 4,800 square feet.

Targeted for graphic artists and architectural firms that need Texas-sized output, the DesignJet comes with PostScript Level 3 support, HP RTL, HP-GL/2 and support for RIP. It has driver support for Windows 95/NT and Macintosh.

The DesignJet is smart enough to monitor its 300 nozzles for problems. If one fails to fire because it's clogged (the printer uses only 240 at one time) another takes over even during a print job.

The DesignJet comes with up to 68MB of RAM and an internal 2GB hard drive. Communication is left to Ethernet, LocalTalk, Centronics parallel port, and HP JetDirect. And just to prove how bootWorthy it really is, it even comes with a genuine HP Torx wrench and has a notch on top to cut the rolls of paper with. How cool.



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data corruption and back
bootEditors have turned
delivered without flinchi
service of data recovery,
10pt: We begin with Disk
record, and file and directory
errors—just like Windows Sc
selective surface checks (for j
allocation tables, partition tab
8pt: On our test machine, Disk

It may not print at 1440dpi like the Epson, but your output can viewed from across the street.

product info

Price $11,995
Company Hewlett-Packard
Phone 800.354.7622
URL www.hp.com

3Dfx
Rage
US

INCOMING

LUX ET ROBUR

every breath they take
could be your last

Full Force Feedback support
3D spatialized sound
8 player LAN Network play
Atmospheric soundtrack
Stunning lighting FX

Product Information Number 89

Xerox DocuPrint N32

Print Mechanism: Laser

Although color outputs can be really cool, most day-to-day printing is still in black and white. And for those important black-tie affairs, you'll want the DocuPrint N32 by your side.

As indicated by its nomenclature, the DocuPrint N32 can spit out 32 pages per minute—almost 33% faster than other printers in its class. Inside is an Intel i960 66MHz controller, an optional 1.4GB hard drive (for storing resources, fonts, and forms), 12MB of RAM (upgradable to 128MB), and a microfine toner cartridge, which the company claims is good enough to yield up to 23,000 pages (assuming a 5% print area coverage). Maximum dpi is 600x600.

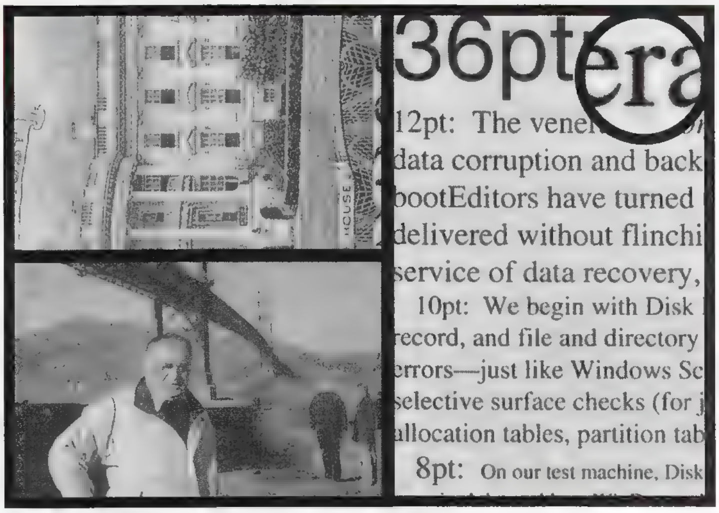
The DocuPrint N32 incorporates Xerox's own proprietary WorkSet technology, which helps eliminate bottlenecks from the actual printing process. It uses memory compression and decompression to RIP document sets just once, and it can print simultaneously while processing and querying other jobs in the print queue. You can also double your pleasure and print on both sides of the paper.

For those of you planning on starting your own printing press or torture chamber, you'll no doubt be ecstatic to play with the DocuPrint N32's traveling, moving stapler unit (not shown), which will let you collate multipage documents, regardless of the page layout. Two 500-sheet trays are included, with support for letter, legal, folio, and envelope media, up to 11x17 in size. A high-capacity feeder, which can hold a total of 3,550 sheets, is an optional upgrade.

The DocuPrint N32 also includes PrinterMap, a handy software utility that allows sys admins to monitor all printer activity on the network. An Ethernet connection is built-in (a token ring NIC is optional), and Xerox includes drivers for various network protocols, including IPX, TCP/IP, and DLC/LLC, as well as multiple operating systems including Windows 95, Windows NT, SunOS, and Solaris.

From a reproduction perspective, the DocuPrint N32 kicks. Grayscale images were great, with excellent half-tones and color gradients. The DocuPrint N32's text repro was good as well, and had virtually no problems handling the variety of large to miniscule sized serif fonts we threw at it.

YOU CAN PLACE 200 SHEETS FACE UP, ADD A MAILBOX OPTION, OR FEED 100 ENVELOPES THROUGH THE FEEDER.



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10pt: We begin with Disk

record, and file and directory

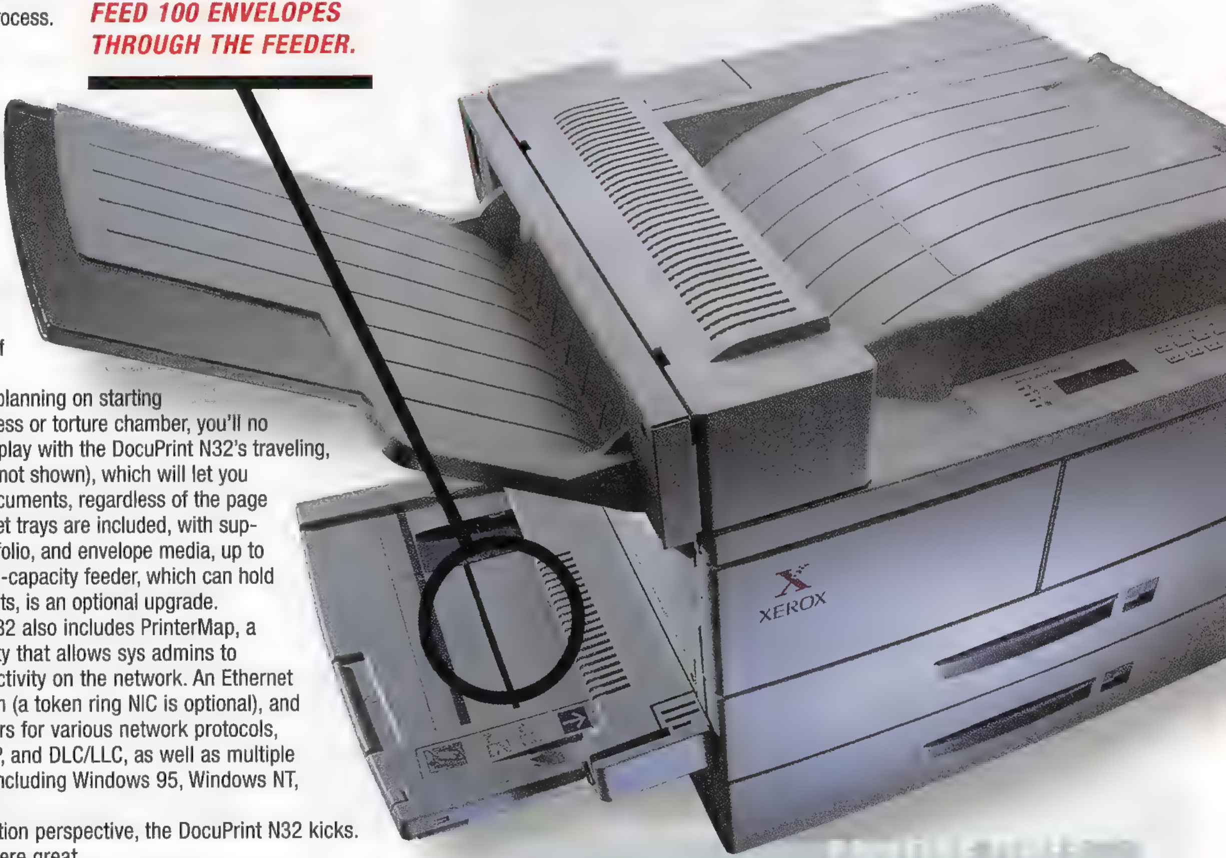
errors—just like Windows Sc

selective surface checks (for j

allocation tables, partition tab

8pt: On our test machine, Disk

The DocuPrint N32 does a terrific job with images and text—big and small.



product info

Price $2,900
Company Xerox
Phone 800.349.3769
URL xerox.networkprinters.com

Time per page expressed in minutes:seconds

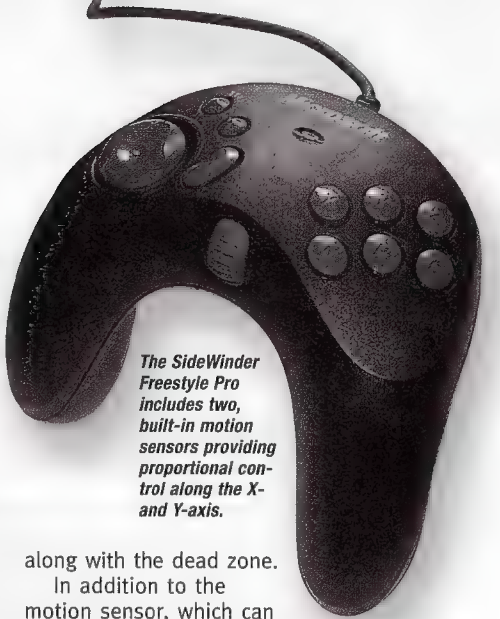
Printer	Text	Dollar Bill	Photograph
Phaser 560	0:28	1:41	16:29
Epson Stylus Color 3000	2:01	2:04	4:24
DesignJet 2500CP	1:28	3:30	15:15
DocuPrint N32	0:12	1:03	11:35

Microsoft **Peripherals**

The software giant dips into the hardware pool

What good is a good game without a good controller and good speakers? Microsoft has apparently been asking that same question, and just in time for the holiday season, it's going to release distinctive new hardware that'll have you wondering "How the hell did I survive just using the keyboard?"

—Bryan Del Rizzo

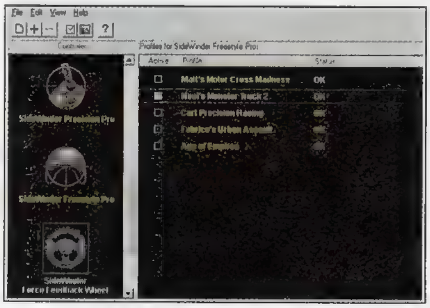


The SideWinder Freestyle Pro includes two, built-in motion sensors providing proportional control along the X- and Y-axis.

SideWinder **Freestyle** Pro

The SideWinder Freestyle Pro is one of the coolest gamepads we've used since the SpaceOrb 360. At first glance, you might dismiss the Freestyle Pro as just another ordinary gamepad (after all, it does look like one), but as Microsoft likes to point out, there's nothing ordinary about it. In fact, Microsoft asked us to refer to it as a "versatile new free-motion PC game controller." In other words, it isn't a gamepad. Got it?

For starters, two solid-state motion detectors-accelerometers are fused together to provide proportional control along the X- and Y-axes. By tilting the entire device left or right, or forward or backward, you can affect game movement independently of the D-pad. For example, in Microsoft's upcoming *Motocross Madness* (see preview on page 70), you can steer left or right by tipping the unit in that direction, or you can pop a wheelie be tipping the unit back toward you. Damned intuitive. The D-pad can still be used for aiming weapons and other normal game controls, and the actual range of motion will be adjustable through software, along with the dead zone.



Profiles for SideWinder Freestyle Pro

Active	Profile	Status
☐	Matt's Motor Cross Madness	OK
☐	Neal's Monster Truck 2	OK
☐	Cart Precision Racing	[illegible]
☐	Fabrice's Urban Assault	[illegible]
☐	Age of Empires	[illegible]

A new version of the Game Device Profiler *software will ship with both products and will allow customization of button functions, sensitivity, dead zones, and force strength (on the wheel only).*

In addition to the motion sensor, which can be turned on or off with a single button, the Freestyle Pro will also include six programmable fire buttons, oversized pontoons, two programmable triggers, and a thumb-controlled throttle wheel. But unlike Microsoft's current controller—the SideWinder GamePad—the Freestyle Pro will not support multiple players.

Software Bundle: *Full version of Motocross Madness*

product info

Available Q4 1998
Price $69
Company Microsoft
Phone 800.426.9400
URL www.microsoft.com

SideWinder **Force Feedback** Wheel

Microsoft hopes to leave the competition in the dust with the SideWinder Force Feedback Wheel, complete with pedals. And the pair looks to be a sturdy beast.

Both the wheel and the pedals are composed of ABS and Acetal (high-precision/more durable) plastics. The contoured handle—with comfortable detents for your thumbs and fingers—will be covered with a thermal plastic rubber, and the transmission plates and gear posts will be constructed of solid metal.

Just like the Sidewinder Force Feedback Pro joystick, an integrated 16-bit, 25MHz DSP offloads complex effects algorithms from the CPU. The wheel will ship with 2K of RAM and 32K of onboard ROM to accommodate force data, and since it's compatible with DirectInput 5.0, don't worry about compatibility with Immersion's I-Force API, which has been integrated into DirectX 5.0. DirectInput features that were missing last time around include asymetric (negative) condition coefficients, phase granularity, and custom data scaling.

The wheel and pedals appear to be a formidable pair. Best of all, they don't require a serial connection.

However, the wheel will use only one motor to simulate the force effects (the stick used two). Microsoft claims this single motor will have a 30% higher torque, a more efficient transmission, and have twice as much power—1.3 kilograms—at the apex. An optical system will provide accurate steering control and reduce drift and oscillation.

Other wheel features include eight programmable buttons—including two shifters/triggers on the back, a force kill switch, and an easy lock-and-release cam-lock for securing the wheel to your desktop.

Software Bundle: *Full versions of Monster Truck Madness 2 and CART Precision Racing*

product info

Available Q4 1998
Price $199
Company Microsoft
Phone 800.426.9400
URL www.microsoft.com

Microsoft Digital **Sound System** 80

HANDS-ON exclusive

The boys from Redmond enter the aural dimension—with a little help from Philips Electronics—with their forthcoming Digital Sound System 80.

This three-piece subwoofer/satellite combo includes all manner of audio and digital tricks to make the room rumble. On the bass section, the DSS 80 uses a dual driver scenario consisting of a 6-inch paper-cone woofer in a medium-density fiberboard sealed box. Coupled to this woofer and sitting right next to it inside this box is a 6-inch, double-foam, surround-laden, passive radiator driver, or auxiliary diaphragm. This combination, dubbed WooX, allows a small box to kick out deep bass—in this case, the DSS-80's sub box measures in at 3.7 litres. Mids and highs are taken care of by twin sealed satellites, each housing a lone 3-inch midrange driver.

Will a little help from Philips, Microsoft's Digital Sound System 80 can swing either analog or digital.

Powering this little setup are a couple of Class D amplifiers, with 44 watts going to the sub and 16 watts going to each satellite, with the crossover point set to a nonadjustable 160Hz.

But, all this audio tom-foolery is one-half of the Microsoft/Philips combo. While you can link the DSS 80 up via 1/8-inch mini stereo cables, it's not until it interfaces to a system via USB that this system puts the "digital" in DSS. Once enabled, all tunes and tones are piped down the USB port into a digital-to-analog converter located on top of the subwoofer box. Only then is it converted back into a signal palatable for those speakers to use. By digitizing the audio signal, it allows all sorts of digital signal processing to occur, which will include a 10-band graphic equalizer, volume control, and more. Included in all this delectable digital mix is a Philips-developed Microsoft Surround Sound algorithm, which will decode all forms of surround sound, including Dolby Pro Logic, and mixes it up for two-speaker virtualization consumption.

You'll be able to program different equalization settings depending on your listening situation, but you'll need Windows 98 to get full USB functionality.

We fired up a beta box on our own resident Win98 box, and after installing all the necessary USB hub drivers (the device comes up as a USB audio device), we fired up a few games and listened away. With everything set to a flat response, the 3-inch mids kick out a smooth response, but it clearly lacked any real high frequency sparkle. The equalization and DSP software wasn't ready, but once that's in place, you can boost frequencies to your heart's content. The bass did crank out some kick with minimal cone noise.

Once all the components are in place, the Digital Sound System 80 may find its way on a desktop come this holiday season.

product info

Available October 1998
Price $199
Company Microsoft
Phone 800.426.9400
URL www.microsoft.com

HARDWARE ON THE HORIZON AND SOFTWARE SOON TO SHIP

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SideWinder Force-Feedback Wheel 68
Microsoft Digital Sound System 80 68
Motocross Madness 69
FireTeam 70

The boot Tracking Sheet

Vangers	Interactive Magic	02/98
K6 300MHz	**AMD**	**02/98**
K6 3D	**AMD**	**02/98**
M-II PR300	**Cyrix**	**02/98**
nVidia Riva 128ZX	**nVidia**	**02/98**
V2000 3D Compliancy	**Rendition**	**02/98**
Requiem	3DO/Cyclone Studios	02/98
Extreme Warfare	Trilobyte/Red Orb	02/98
Grand Prix Legends	Papyrus/Sierra Online	02/98
Reno Air Racing	Papyrus/Sierra Online	02/98
MechCommander	Microprose	02/98
Thief: The Dark Project	Eidos/Looking Glass	02/98
Grim Fandango	LucasArts	02/98
Dark Vengeance	Reality Bytes	02/98
Descent: Free Space	Interplay/Volition	02/98
Daikatana	Ion Storm/Eidos	02/98
Maya	**Alias Wavefront**	**6/98**
Matrox MGA-G100	**Matrox**	**6/98**
Matrox MGA-G200	**Matrox**	**6/98**
PowerVR Second Generation	**NEC/VideoLogic**	**03/98**
Aureal Vortex	**Aureal**	**03/98**
M-II PR350	**Cyrix**	**03/98**
Cayenne 266MHz	**Cyrix**	**03/98**
Pentium II/Slot 2	**Intel**	**03/98**
450NX AGPset	**Intel**	**03/98**
440LX-R AGPset	**Intel**	**03/98**
450NX AGPset/w [illegible]	**Intel**	**03/98**
TwiN Texel 4	**nVidia**	**03/98**
Kings Quest: Mask of Eternity	Sierra Online	03/98
10th Planet	Bethesda	03/98
Messiah	Shiny/Interplay	03/98
Windows 98/Memphis	Microsoft	03/98
Duke Nukem Forever	3D Realms	03/98
Star Trek: Klingon Honor Guard	Microprose	03/98
Star Trek Klingon Academy	Interplay	10/98
DVxpress 7110/7112	**C-Cube**	**04/98**
Myth II: Soulblighter	Bungie	04/98
Tom Clancy's Rainbow Six	Red Storm	04/98
Verite V3000	**Rendition**	**04/98**
Banshee	**3Dfx**	**04/98**
Final Fantasy VII	Squaresoft/Eidos	04/98
Descent III	Interplay	
	Outrage Entertainment	04/98
Prey	3D Realms	04/98
Shogo	Ion Storm	04/98
Starship Troopers	Microprose	04/98
Windows NT 5.0	Microsoft	04/98
K6+3D	**AMD**	**04/98**
Katmai	**Intel**	**04/98-01/99**
Rainbow Six	Red Storm Entertainment	04/98

*These dates are subject to change.
**Bold indicates hardware

Motocross Madness

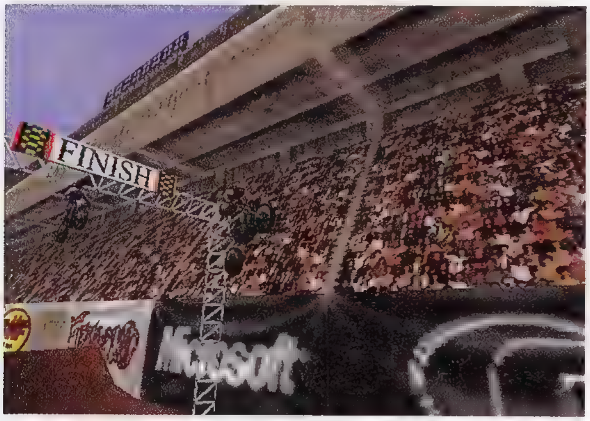
That's gotta hurt!

Thanks to Rainbow Studios, soon you'll be strapping on a helmet and performing such moves as the "nac-nac," "right fender-bender," and the "big-kahuna surfer," just like the motocross racing pros.

We spoke to ***Robb Rinard****, director of production at Rainbow Studios, to find out more about* Motocross Madness*, and the very real sport behind it.*

Frequent flier members will receive up to 500 miles for this race.

boot ***How did Motocross Madness mature from a Talisman demo into a full-fledged game?***
Robb Microsoft originally contracted Rainbow to make a rendering engine utilizing the new Talisman hardware. The most significant portion of that Aardvark engine is still in the terrain level-of-detail evaluation. This code allows us to drive around on a terrain database of several million polygons in realtime and dynamically evaluate the terrain from any angle on every rendered frame, and then hand an optimized set of polygons to D3D for rendering. The texture draped over terrain is 1024x1024 resolution. And the game engine dynamically tessellates the mesh to produce a believable-looking world at runtime.



Head clearance is dangerously low on that "Finish" sign.

Talisman was never intended to run on first- or second-generation 3D hardware, but its scalability allows us to run on the full range of D3D supported hardware (except the original ATI Rage).

boot ***Tell us about the physics model.***
Robb We studied hours of motocross footage, spoke to every knowledgeable rider we could, and went back and forth for over a year on how the bike should behave. We ended up with great balance between realism and gameplay. I would describe the way the bike drives as about 80% real and 20% arcade. Some elements of realism would just simply have been to difficult for an end user to deal with (such as three-axis control), so we tried to balance the realism with an arcade experience.

boot ***Is the AI aggressive?***
Robb Our AI players are real "thinking machines." They'll learn from each other and the end user as they ride around in realtime. If you're doing really well on one part of the track, the AI will catch on to what you're doing, and start emulating the way you take certain jumps and corners. Likewise, if they're kicking your ass, they'll tone it down so you can stay competitive with them. They also have an "anger factor." If you're in their way, they get really rude and start to crowd you.

boot ***How are character animations handled?***
Robb Our character animation system, Soultree, takes either keyframed or motion-capture data as input. Using a set of motion-blending techniques, we can link a diverse set of animation together in a believable way. For example, when the rider is sitting still on the bike, you can move the joystick forward, backward, left, and right. The rider leans forward, back, and all around. What you are seeing is seven sets of animations all working together and being blended. This works really well when the rider wrecks and flies off the bike. We have a collection of wrecking animations that we can seamlessly flow between.

boot ***Nasty wrecks rule!***
Robb The wrecks are one of the funniest elements of the game. You see your rider just get hammered, launch off the bike, and sail through the air. There are million ways to bite it. It's nothing short of hysterical. Sadistic, but hysterical!

boot ***What other effects will we see in the game?***
Robb Each bike emits a stream of dust and chunks of dirt fly out behind as a rider brodies around a corner. Watch for flying sparks when two riders collide. Also, when driving the bike from a unique camera view we call "Bird's Eye," the rider can drive away from the camera into the distance. The effect of the rider starting to disappear into the distant fog is photorealistic. The realtime shadows are definitely very cool too.

boot ***How realistic are the shadows?***
Robb Our rendering technique enables us to completely ray-cast physically correct shadows, stretching and foreshortening as in real life. The shadows are occluded by the terrain when the player goes into the shade and the bike and rider are even partially lit as they go in and out too.

boot ***How many bikes, tracks, missions, and stadiums are in the game?***
Robb The game is broken down into: Stunt Quarry, Baja (Waypoint Racing), Nationals, Supercross, and Moto-Tag. Stunt Quarry is a great place for beginners to get a feel for the bike. Baja allows you to really explore the terrains while racing sequentially between gates. Nationals incorporates all the elements of real outdoor motocross, including doubles, triples, rhythms, tabletops, and megajumps. Supercross is the pinnacle of motocross racing and requires precision skills. All together there are more than 40 tracks, and a custom editor too.

boot ***How about multiplayer mayhem?***
Robb We support eight-player LAN (TCP/IPX), two-player modem/serial null modem, and four-player Internet.

product info

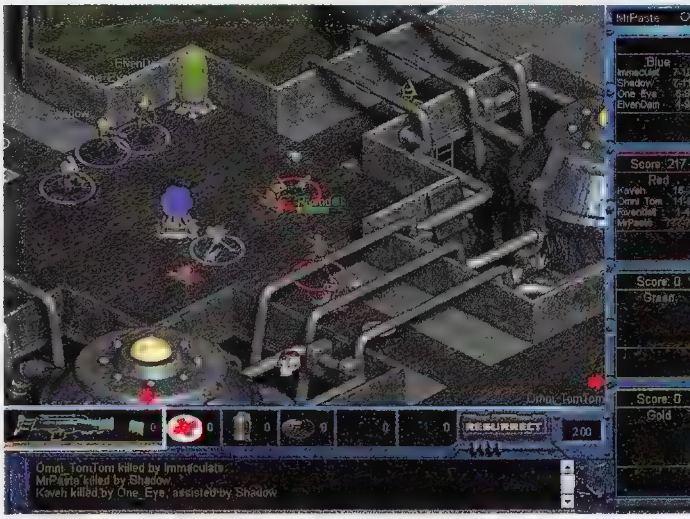
Available ***Fall 1998***
Price ***TBA***
Developer ***Rainbow Studios***
Publisher ***Microsoft Corp.***
Phone ***800.426.9400***
URL ***www.microsoft.com/games***

FireTeam

The next generation of Internet gaming

***Ned Lerner**, CEO of Multitude, has a vision for Internet games. His company's new title,* FireTeam, *uses online technology that's never been explored before, including a game engine built from the ground up for the Internet; an Internet-based network that enhances game speed; and TeamTalk, a patent-pending voice technology that allows realtime, hands-free communication among team members.*

We talked with Lerner about the future of online gaming and what makes FireTeam *so groundbreaking.*

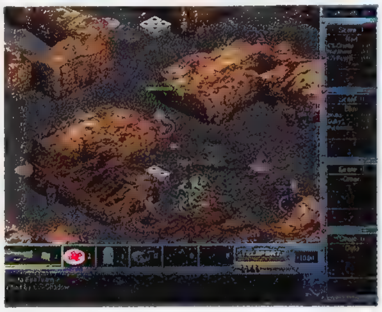


Omni_TomTom killed by Immaculate
MrPaste killed by Shadow
Kaveh killed by One_Eye, assisted by Shadow

Three Blue Team members defend one of their Blue bases against an unwary Red Team member, who is obviously outgunned.

***boot** What is the future of online gaming?*

Lerner The future is social. Most online games are still unsociable—you don't work together to win, you try to kill the other players or conquer the world. *FireTeam* is the first truly social game, thanks to the combination of Internet, team, and voice. We see *FireTeam* as proof that it's more fun to play as a team, but it won't be fully realized until most games are played in social groups.



A Red Team two-man squad has caught a Blue Team member alone. But another Blue Team member is coming to his teammate's rescue.

***boot** What sets* FireTeam *apart from other multiplayer titles?*

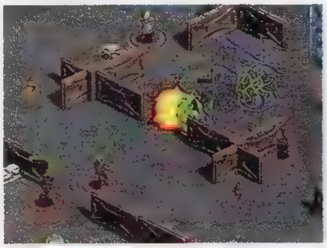
Lerner Team play and voice communication. I don't think you can do one without the other, and we're the first to figure out how to do the voice. We hook you up to your team via an included headset and our custom Internet conference-calling system. We also have the advantage of designing the whole experience (web site, tools, game, lobby, locker room, contests, service) so it's a lot tighter than the people who are bolting Internet play onto a solitaire game. We're also trying to create a magazine-like service, with something cool to look forward to every month.

***boot** Tell us about* FireTeam*'s gameplay.*

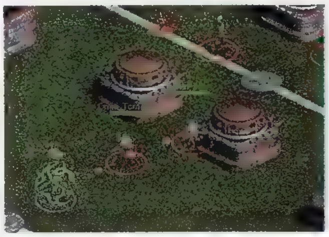
Lerner You meet friends or friendly strangers in our lobby, which is the first custom-designed for team play. You form up in teams of two to four and square off against two to four other teams in *XCOM*-like team combat, though pacing is probably closer to *Quake*. Games are all ten minutes long, and the key to victory is team coordination. Currently there are 30 maps and four styles of games—Gunball, Team Deathmatch, BaseTag, and Capture the Flag. Gunball is like combat football. Team Deathmatch is a team version of the classic last-man-standing online game. BaseTag is a bit like paintball. Capture the Flag is a game of holding territory marked by flags. Currently there are three main characters, a scout, commando, and heavy gunner, each with an interesting set of strengths and weaknesses. We'll be releasing more stuff about once a month.

***boot** Not everyone at home has a T1 line. What have you done to address low-bandwidth issues?*

Lerner Every player gets a CD so they don't have to download anything, unless they want to. We pay for the best possible quality Internet connections and servers. We've spent months testing and optimizing the game for real people with standard 28.8 modems connected by the real Internet. Our game was made to accept 5% packet loss and one second of latency.



In Capture the Flag, the Blue Team defends their flags against the Reds.



Gunball is football — to the death!

***boot** Can you talk about the patent for your realtime voice capability that allows four players to talk at once?*

Lerner In our patent-pending technique, a player sends his/her voice to the server. The server collects all the voices and sends any other voices, unmixed, back to the player. The player's machine then mixes everyone else's voices in with the other sounds of the game world. This allows us to make a custom mix for each player, which is critical. In older voice conferencing systems the server mixes all the voices, which means Joe, Bob, and Bill all hear the same thing, when you really want Joe to hear Bob and Bill, Bob to hear Joe and Bill, and Bill to hear Joe and Bob. It allows us to treat the voice as a sound effect—the only way to do 3D sound effects.

***boot** Will* FireTeam *only play over the Internet? Or can users play over Intranets and modem-to-modem?*

Lerner It will be Internet only. The game requires a server. There is a lot of cool stuff you can do with a server, especially a server on the Internet. It's cheaper to give away the server for LAN play, but the player experience suffers because no one is in charge.

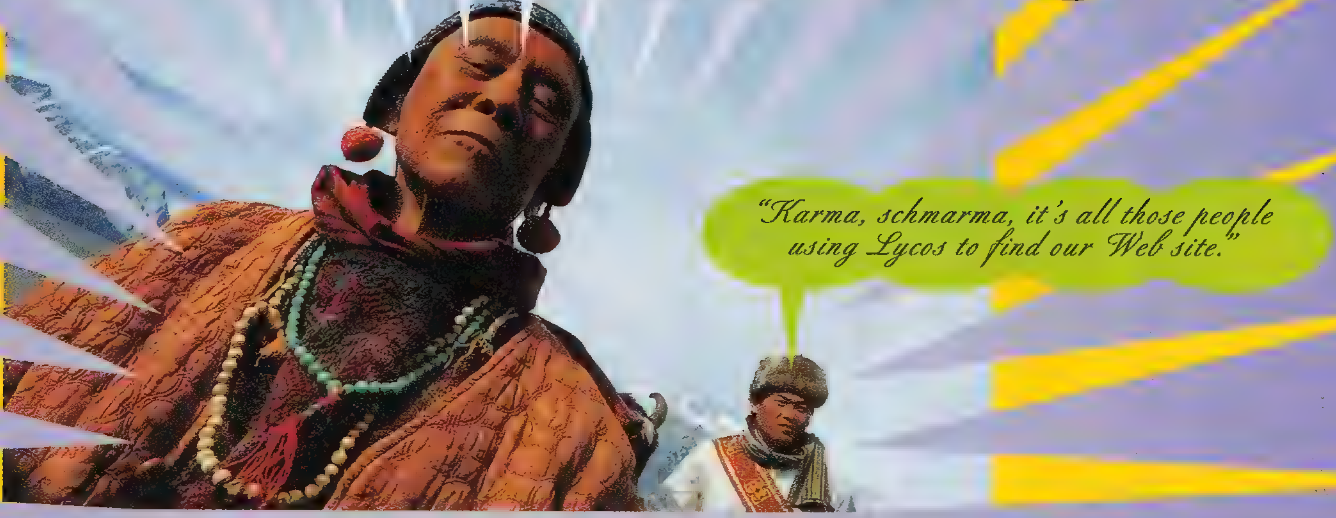
***boot** How much will* FireTeam *cost for, say, two hours of gameplay?*

Lerner FireTeam will ship with a month of unlimited play. Additional months are $9.95. Two hours or two hundred cost the same.

product info

Available June 1998
Price $49.95 + $9.95/month
Company Multitude Inc.
Phone 888.689.8326
URL www.fireteam.com

"I AM A GUIDE TO THE HIMALAYAS.
THEY CALL ME A SHERPA. PEOPLE COME TO ME
FROM ALL OVER FOR MY SHERPANESS.
I DON'T KNOW HOW
THEY FIND ME
IT MUST BE KARMA."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bootLab **Policy**

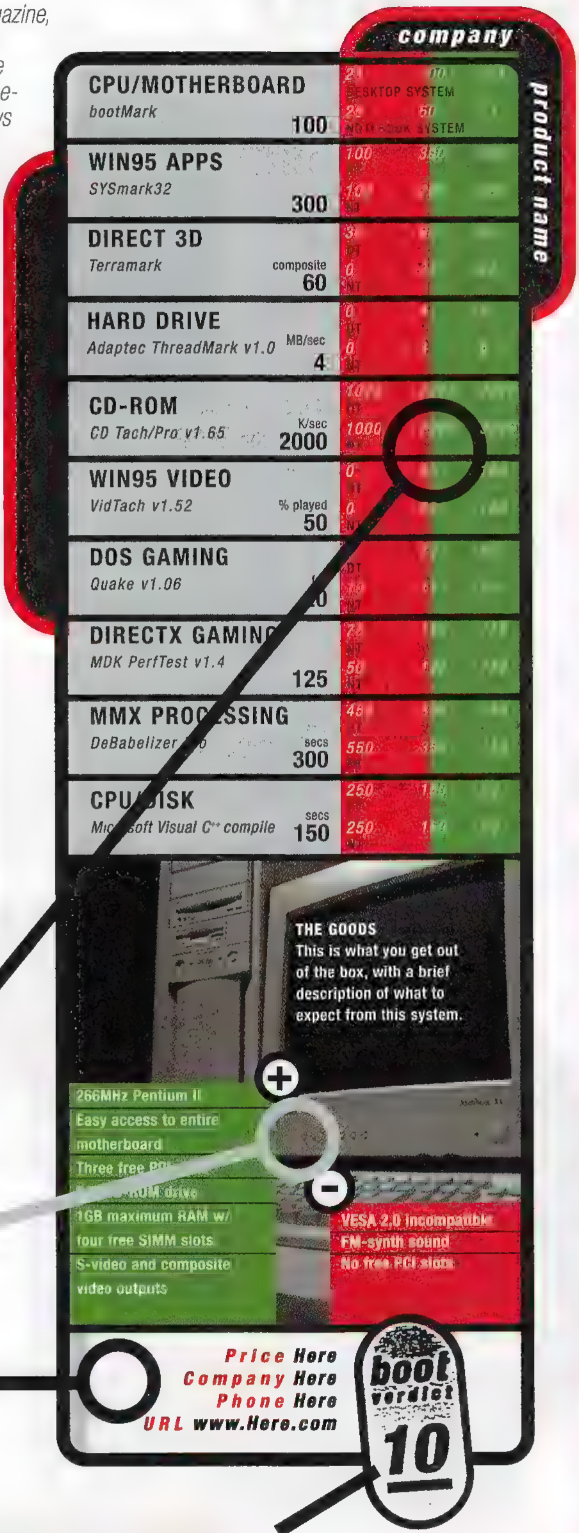
boot *isn't like any other computer magazine, and neither is our product-**evaluation** process. We don't test equipment in the cold, sterile environment of a warehouse-sized lab, and we don't write our reviews based on the **test scores** that labcoat-wearing technicians scribble on clipboards.*

*Our review **scores** are based on a combination of objective **benchmark** testing, real-world performance, and our subjective evaluation of features, performance, and the many less tangible **characteristics** that go into a product. All our evaluations are based on **hands-on** use of the product.*

3D Benchmarks

Final Reality and X

We've added two new tests to our 3D benchmarking bag of tricks. X is an upcoming Direct3D space-combat and trading game from EgoSoft. The demo runs through a scripted series of scenes and reports an average frame rate. Final Reality, *a comprehensive 2D/3D benchmark developed by VNU European Labs, is based around a game engine from Remedy Entertainment's upcoming* Max Payne. *It tests several flythrough scenes, as well as some abstract performance tests. Look for both new tests on the bootDisc.*



company
product name
CPU/MOTHERBOARD
bootMark
100
DESKTOP SYSTEM
NOTEBOOK SYSTEM
WIN95 APPS
SYSmark32
300
DIRECT 3D
Terramark
composite
60
HARD DRIVE
Adaptec ThreadMark v1.0
MB/sec
4
CD-ROM
CD Tach/Pro v1.65
K/sec
2000
WIN95 VIDEO
VidTach v1.52
% played
50
DOS GAMING
Quake v1.06
DIRECTX GAMING
MDK PerfTest v1.4
125
MMX PROCESSING
DeBabelizer
secs
300
CPU/DISK
Microsoft Visual C++ compile
secs
150
THE GOODS
This is what you get out of the box, with a brief description of what to expect from this system.
+
266MHz Pentium II
Easy access to entire motherboard
Three free PCI
ROM drive
1GB maximum RAM w/ four free SIMM slots
S-video and composite video outputs
–
VESA 2.0 incompatible
FM-synth sound
No free PCI slots
Price Here
Company Here
Phone Here
URL www.Here.com
boot verdict
10

REAL-WORLD BENCHMARKING

The new meter has the precise scores for each category benchmarked. Plus, the color bars to the right give you a quick idea of how well the system performed in that category.

It's simple: The farther right the bar reaches, the better the system scored. Green means the system performed on par or beyond what we expect of a current system. If you see nothing but red, the system performed below expectations.

PLUSES AND MINUSES

Here's where we list the best and worst a system has to offer.

CONTACTS

Look here for price and the company's phone number and URL if you want more information.

BOOT VERDICT

The one that really matters. This score reflects how we feel about a system, taking into account the benchmark results, quality of parts, usability, overall performance, and our intense, under-the-hood scrutiny.

boot KICK ASS! PRODUCT

Only the **best** earn enough respect to be worthy of our **editors'-choice** award.

REVIEWS

KICKIN' THE TIRES ON THE LATEST **HARDWARE** AND TAKIN' THE NEWEST **SOFTWARE** OUT FOR A SPIN

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ATI All-In-Wonder Pro 8MB AGP 78
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Orchid Righteous 3D II 78
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Shark Multimedia Predator 3D 86
Creative Labs Sound Blaster PCI64 86
Turtle Beach Malibu Surround 64 86
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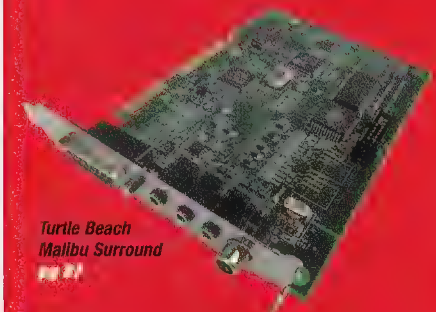

Turtle Beach Malibu Surround pg [illegible]

SOFTWARE

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Starcraft 85
QuickTime 3.0 Pro 88
Mysteries Of The Sith 88
ViaVoice Gold 89
NaturallySpeaking 89

Compaq **Presario** 5630

A Swiss-Army PC

boot KICK ASS! PRODUCT

Given the Presario 5630's less-than-impressive lineage, we weren't expecting to be wowed by it. But we were.

This system represents the finer things in life, and more. It has a 400MHz Pentium II processor on an ATX motherboard with a 100MHz system bus. For video, there's a second-generation DVD-ROM drive, Voodoo^2, and TV-out. A husky 12.9GB IBM hard drive and Zip drive provide storage galore, and there's even an onboard NIC for a network nexus.

And to top it off, it's the first system we've seen with all its ISA slots empty. Holy guacamole.

With all that protein packed inside, you'd expect the 5630's performance to zing off the charts. In fact, the 5630 came within a hair of the 400MHz machines reviewed in last month's "Speed Trap" (*boot* 21) in all the benchmarks, leaving its older brother—the Presario 4880—in the dust. And when we finally powered down the 5630 to give it a well-deserved rest, we discovered it had set a new performance record in the process—taking only 72 seconds to complete the C++ compile. Phew!

Inside, the AGP slot is occupied by ATI's Rage Pro LT—a beefed-up version of the Rage Pro Turbo designed specifically for desktops (or notebooks) using an LCD display. The card is equipped with three separate outputs, so if you have the hardware, you can simultaneously hook up a CRT, flat panel, and TV. The Rage Pro LT has built-in scalers for the flat panel interface and the TV, so all three displays can be configured for different resolutions (but not different refresh rates). Way cool.

The two PCI slots are both filled, one by Diamond's studly Monster 3D II, the other by a Rockwell modem (the first PCI modem we've seen). But before you start wailing about only two PCI slots (our tears were a torrential river at first), the pain is softened somewhat—but not completely—by the inclusion of an onboard PCI audio chip and a 10Mb Ethernet port (which, when you think about it, could've eaten up another two slots anyway). And, you always have the option of ditching the PCI modem to make more space (say, for dual SLI gaming or a SCSI controller).

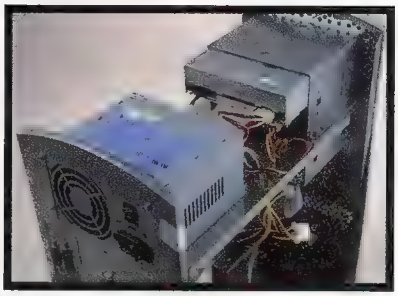
The onboard ESS Maestro sound chip is a beaut, offering 64-voice hardware wavetable, a user-definable 2MB or 4MB sample set, DOS legacy support, and DirectSound acceleration. Plus compatibility with Aureal's A3D sound standard. Even the speakers, which can be hooked onto the side of the monitor or stand alone on the desktop, proved to be exemplary, with a good center channel, excellent near field response, and rich, upper mid-bass reproduction. Most impressive.

And we dig the front-access USB and 1394 ports. The eject buttons for the floppy and DVD-ROM are oversized and have great tactility too.

In fact, about the only other complaint we have is with the hard drive's sluggish transfer rate: at only 5MB/sec, we would've preferred something more zippy.

Overall however, the Presario 5630 is a digital dream. It's fast, it's fully loaded, and it rocks. In short, we love it.

—Bryan Del Rizzo



DIVISION AMONG THE RANKS

The power supply (with its own built-in fan), CD-ROM drive, and Zip drive are secluded from the rest of the PC by a metal divider.

MAGIC SHELL... IN THREE TASTY FLAVORS

The Pentium II 400MHz has its own dedicated heatsink. The dedicated fan keeps things mighty cool thanks to that honking huge plastic shell that helps direct the airflow right onto the processor.

under the hood

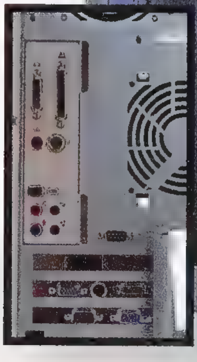
THE BRAINS	
CPU	Intel Pentium II 400MHz
L2 Cache	512K pipeline burst
RAM	128MB SDRAM (384MB max)
Motherboard	Intel 400BX with 100MHz system bus
THE BRAWN	
Video	ATI Rage Pro LT with 8MB SGRAM, Diamond Monster 3D II with 8MB EDO DRAM
Hard Drive	IBM Deskstar 12.9GB Ultra DMA
CD-ROM	Various 2x DVD-ROM
Expansion Bus	Two ISA, two PCI, one AGP
Fax/Modem	Rockwell PCI 56Kbps data/fax modem ITU V.90-compatible
I/O Ports	Two serial, one parallel, dual PS/2, dual USB (front only), MIDI/gameport, dual IEEE 1394 (front and back), 10BaseT NIC, DFP (digital connector for flat-panel displays)
THE BEAUTY	
Case	Three 5.25-inch bays, one 3.5-inch bay
Display	Compaq 14.1-inch FP 500 flat panel, 1024x768 max resolution
Sound	ESS Maestro PCI audio accelerator, hardware wavetable (2MB or 4MB sample sets), legacy support, A3D-compatible
Speakers	JBL Pro stereo speakers
Other	100MB Zip Drive

EXPANSION MAP

AGP	[illegible]
PCI	Modem
PCI	3D Video
ISA	Free
ISA	Free

THE BUNDLE Microsoft Windows 98 | Works | Encarta | Encyclopedia 98 | Bookshelf 98 | Money 98 | Quicken Basic 98 | MotoRacer (MMX) | Incoming (AGP) | Adaptec's DV Deck | Asymetrix DV | IPhoto Express | McAfee AntiVirus | Quick-restore disks

boot	down
1:28	:02



PLUG IT IN, PLUG IT IN

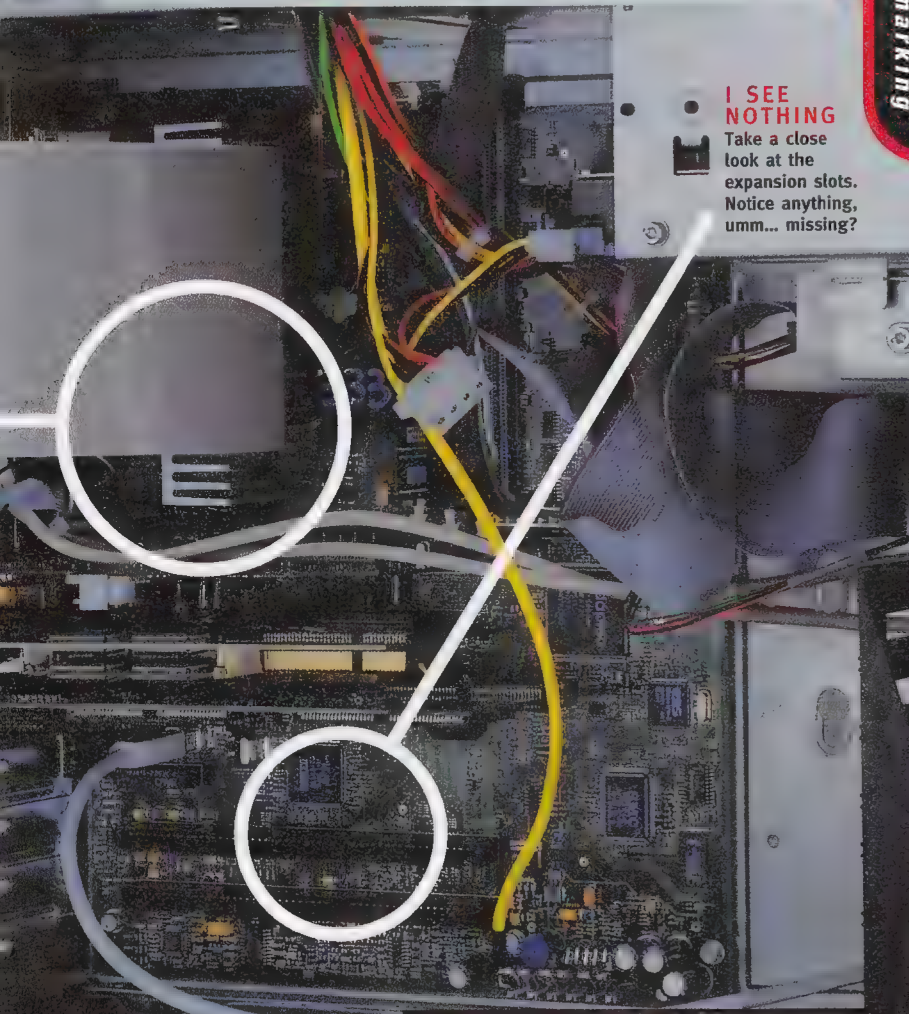
The rear panel is adorned with the usual accoutrements, but there's an added bonus—a secondary 1394 port. And check out the ATI videocard; notice the three outputs?

THE FP500 FLAT PANEL MONITOR

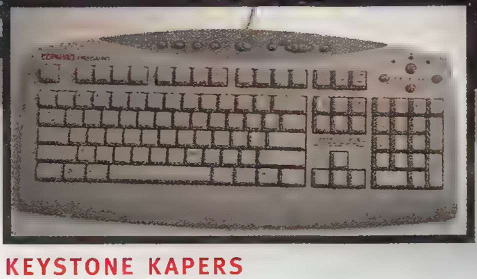
When we discovered this particular build-to-order configuration shipped with an optional $999 14.1-inch flat-panel monitor, we weren't expecting much, especially considering the majority of flat panels we've previously reviewed have either (a) cost too much or (b) compromised performance. Not this one.

The FP500 uses the Digital Flat Panel (DFP) interface—an all digital connection—which is integrated on the ATI Rage Pro LT videocard. The DFP is a mixed blessing. The pure digital connection reduces noise accumulation and blurry images, and improves overall clarity and text legibility. The downside is that you can't connect the FP500 to a PC that isn't DFP-compatible. And because it uses a pure digital connection, you won't be able to play 3D accelerated games with videocards utilizing an analog pass-through (such as the 5630's Voodoo^2).

There was virtually no geometric distortion, no ghosting, and virtually no color convergence problems. And best of all, there were no stuck pixels, a rarity for flat panel displays. The FP500's color intensity and scaling were excellent (only minor blooming was noticed) and passed our color-on-color text tests with, well, flying colors. Off-axis viewing was mediocre, although the lighter the screen became, the harder it was to see from more severe angles or positions.



I SEE NOTHING
Take a close look at the expansion slots. Notice anything, umm... missing?



KEYSTONE KAPERS
The keyboard includes special buttons that let you access the DVD controls, adjust volume, or launch favorite applications. There's also four buttons relating to specific Internet functions.

Compaq
Presario 5630
real-world benchmarking

Test	Benchmark	Unit	Score
CPU/MOTHERBOARD	bootMark		191
WIN95 APPS	SYSmark32		N/A*
DIRECT3D	ForsakenMark	composite	109.82
HARD DRIVE	Adaptec ThreadMark v2.0	MB/sec	5
CD-ROM	CD Tach/Pro v1.65	K/sec	1648
WIN95 VIDEO	ActiveMovie	% played	100
DOS GAMING	Quake v1.06	fps	30
DIRECTX GAMING	MDK PerfTest v1.4		161
MMX PROCESSING	DeBabelizer Pro	secs	158
CPU/DISK	Microsoft Visual C++ compile	secs	72

Compaq's Presario 5630 represents a new PC paradigm for the company, and all we can say is, it's about time. This is a terrific system, balancing the needs of the hardcore gamers, digital video enthusiasts, and early adopters.

+
- Pentium II 400MHz
- ATX form factor
- ISA-less design
- Onboard Ethernet NIC
- Onboard PCI audio and Aureal 3D
- [illegible]
- IEEE 1394 ports
- Front USB ports
- Affordable flat-panel display
- Impressive speakers
- Video options/performance
- Software bundle

−
- Only two PCI slots
- Sluggish hard drive

Price ***$3,997***
(as configured with flat panel)
Company ***Compaq Computer***
Phone ***800.345.1518***
URL ***www.compaq.com***

boot verdict
9

A complete breakdown of benchmark results is available on the *bootNet*. Point your browser to

* Bapco has not yet released a version of SYSmark 32 for Windows 98. Once we receive a copy of the final benchmark, we'll test the Presario 5630, and post the results online.

Also, the unit *boot* tested was not a final production model. As a result, the Macrovision drivers for DVD playback were not available and were not tested.

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OLYMPUS LENS 1:2.8 5mm

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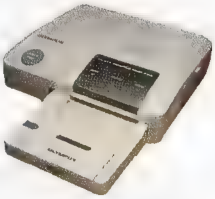
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OUR REVEALING BACK

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Product Information Number 260

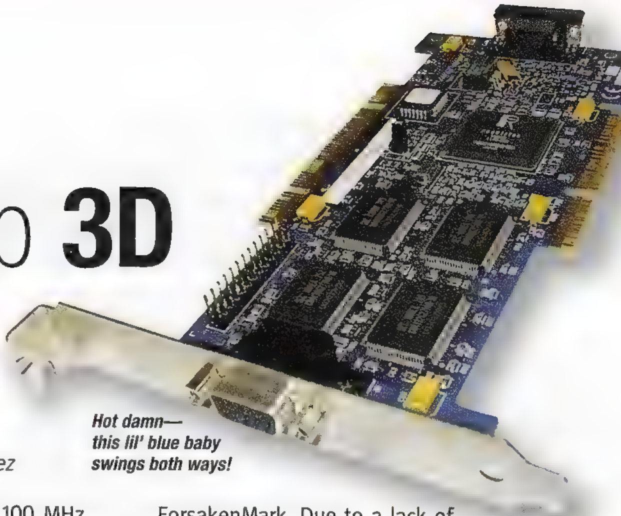
Everything Comes Up **3D**

Who you gonna call?

Three cards that have absolutely nothing in common...except that they all claim to do one thing the best—everything that is good and wholesome in 3D, including texture-mapping and bilinear filtering.

Take a peek and see who you're gonna call.

—Andrew Sanchez



Hot damn—this lil' blue baby swings both ways!

Jazz Multimedia's **Bonnie & Clyde**

Here's a freaky videocard for you—a Rendition V2200-based board with both a PCI and an AGP bus! Madness? Perhaps, but Jazz's Bonnie & Clyde is such an animal; a cobalt-blue beast that swings both ways.

How is this possible? The V2200, in its AGP form, is a simple 1x/DMA part, which means it does not take advantage of direct execution of textures from system memory. So, it acts like a 66MHz PCI card when slipped into an AGP slot. With a change of a jumper and the reinstallation of the mounting bracket, the B&C can move between expansion slots without effort. While 4MB of nonupgradable 100 MHz SGRAM memory will get you 16-bit Z-buffered madness up to 800x600, Jazz is notorious for giving you a bare-bones configuration and passing the savings on—so no TV ins or outs for you!

Installation was uneventful, with the board using the same drivers regardless. But, your 16-bit colors will be restricted to 1280x1024.

The B&C performed swimmingly. Under its PCI incarnation, the board almost mirrored other V2200-based 2D DOS performance. As an AGP part, the board bounced about, surpassing the PCI scores in some tests such as 640x480 *Turok* and *X*, while tripping back at 800x600 ForsakenMark. Due to a lack of video memory, you shouldn't try *Quake II* at 1024x768. As usual with the V2200, visual quality is superb, with excellent color saturation and balance.

The B&C makes an excellent upgrade card if you're thinking of making the AGP jump soon... but maybe not just yet.

THE STATS Win95 drivers: 4.03.01 (build 3493) **THE BUNDLE** None

Price ***$199***
Company ***Jazz Multimedia***
Phone ***408.727.8900***
URL ***www.jazzmm.com***

boot verdict 8

Orchid's **Righteous** 3D II

boot KICK ASS! PRODUCT

Orchid is answering the clarion call with its latest claim to fame, the Righteous 3D II.

Centered on 3Dfx's triple 64-bit powered processors, it's Voodoo^2 powered and armed to the teeth with 12MB of 100MHz Silicon Magic EDO DRAM (an 8MB version is also in the works). The add-in board follows the standard PCI reference-board design of dual-texelfx2 and solo-pixelfx2 chips, although the drivers contain a slew of tweaks, including the ability to overclock your Voodoo^2 from 90Hz to 95Hz—excellent.

We conducted all tests using the default 90Hz setting.

Support for D3D, Glide, and OpenGL (via mini drivers) is included, while the architecture itself boasts bi/trilinear-filtering, perspective correct texture-mapping, mip-mapping, fogging, and all manner of alpha-blending and fogging.

Installation in single or dual SLI configurations proved painless, with Orchid supplying the necessary 1.5-inch ribbon cable.

When compared to two other Voodoo^2 boards (Creative's 3D Blaster Voodoo^2 and Diamond's Monster 3D II reviewed in *boot* 21), the Righteous 3D II is right in the middle, posting scores that meet or exceed some of the scores posted by the 3D Blaster II. From *Forsaken* to *Quake II*, the board keeps up with the pack. Without a second board in tow, you'll be limited to a maximum Z-buffered resolution of 800x600. With an SLI combo, you can crank it up to 1024x768. Visual quality is typical 3Dfx—smoothly filtered, with no pixelated textures. But those horizontal dithering lines will be in attendance, unless you force the advanced texture filtering in the control panel.

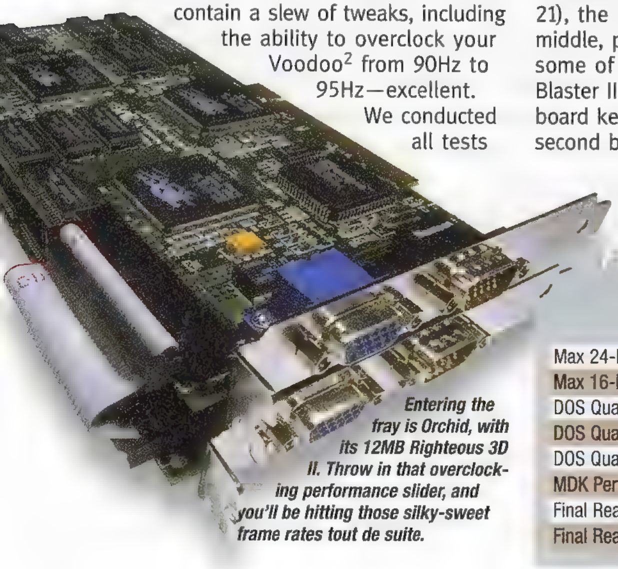
We threw a slew of accelerated games at it, and the majority worked without a hitch.

Add Orchid to the list of Voodoo^2 board makers, and expect killer 60fps+ performance for all your gaming needs.

THE STATS Win95 Drivers: 4.10.00 1.2D I D3D drivers: 4.10.00 **THE BUNDLE** Win95 drivers I Incoming I Battlezone I Jedi Knight: Ambush at Altyr 5 I Final Reality I G-Police (A3D enhanced)

Price ***$299***
Company ***Orchid***
Phone ***800.577.0977***
URL ***www.orchid.com***

boot verdict 9

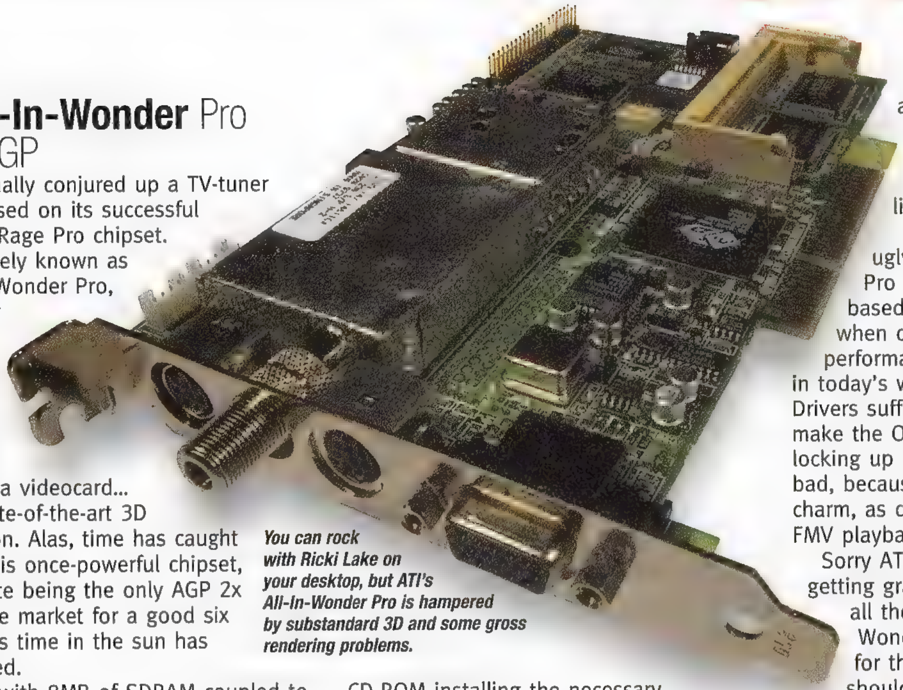


Entering the fray is Orchid, with its 12MB Righteous 3D II. Throw in that overclocking performance slider, and you'll be hitting those silky-sweet frame rates tout de suite.

FEATURE SET AND 2D PERFORMANCE

	ATI All-In-Wonder Pro (8MB)	Jazz Bonnie & Clyde AGP (4MB)	Jazz Bonnie & Clyde PCI (4MB)
Max 24-bit resolution/refresh rate	1600x1200/75Hz	1024x768/75Hz	1024x768/75Hz
Max 16-bit resolution/refresh rate	1600x1200/85Hz	1280x1024/85Hz	1280x1024/85Hz
DOS Quake (320x240)	50.3fps	75.4fps	73.8fps
DOS Quake (640x480)	25.1fps	25.3fps	24.9fps
DOS Quake (800x600)	18.6fps	22.7fps	21.9fps
MDK PerfTest v1.4 (DirectDraw)	128	127	123
Final Reality Radial Blur (DirectDraw)	29.8fps	29.74fps	29.84fps
Final Reality Chaos Zoomer (DirectDraw)	47.22fps	46.60fps	46.66fps

ATI **All-In-Wonder** Pro 8MB AGP



You can rock with Ricki Lake on your desktop, but ATI's All-In-Wonder Pro is hampered by substandard 3D and some gross rendering problems.

ATI has finally conjured up a TV-tuner variant based on its successful 64-bit 3D Rage Pro chipset. Appropriately known as the All-In-Wonder Pro, this PCI or AGP 2x part has just about everything you could ask for in a videocard... except state-of-the-art 3D acceleration. Alas, time has caught up with this once-powerful chipset, and despite being the only AGP 2x part on the market for a good six months, its time in the sun has now passed.

Armed with 8MB of SDRAM coupled to a 230MHz RAMDAC, the All-In-Wonder Pro throws a cable-ready DBX stereo TV tuner to the mix. This makes for a cramped I/O header connector, so the majority of I/O ports are slapped onto dual DIN cables. The base model is sold with 4MB (field upgradable to 8MB), the All-In-Wonder Pro supports Direct3D and recently OpenGL via ICD (still in early beta).

Installation of the hefty silicon-heavy board is a snap, with the accompanying CD-ROM installing the necessary drivers for TV-tuner functionality. All the TV-tuner tricks the All-In-Wonder Pro exhibits are Win95-specific—everyone else is out of luck.

Under our slew of benchmarks, the board performed below average, regardless of API. The GL drivers are way undercooked and alpha as hell, but the Direct3D performance, even with the recently released "Turbo drivers," remained barely acceptable. Scores such as an average 640x480 ForsakenMark of 49.17fps won't make speed-freaks hot-and-bothered, nor will the ultra-limp 23.1fps at 640x480 *Turok*.

Visual quality is also a nasty, ugly sore-spot with ATI's 3D Rage Pro chip. The blocky polygon-based rendered explosions in *Turok*, when combined with the lackluster performance, simply aren't acceptable in today's world. Even then, these Turbo Drivers suffer from bugginess that would make the Orkin-Man itch, with systems locking up for no apparent reason. Too bad, because the TV tuner works like a charm, as does the smoothly filtered FMV playback.

Sorry ATI, but the 3D Rage Pro is getting gray around the edges, despite all the cool techno-gizmos the All-In-Wonder Pro provides. Folks looking for the ultimate all-in-one solution should look elsewhere.

THE STATS Win95 drivers: v5.0 Turbo build 4.10.2312
THE BUNDLE Director 5.0 I Incoming, G-Police I Videowave

Price ***$400***
Company ***ATI***
Phone ***905.882.2600***
URL ***www.atitech.com***

boot verdict
6

DARE TO COMPARE

Benchmark	ATI All-In-Wonder Pro	Jazz Bonnie & Clyde AGP (4MB)	Jazz Bonnie & Clyde PCI (4MB)	Righteous 3D (single)	Righteous 3D (Dual SLI)
Refresh rate tested	120Hz	120Hz	120Hz	120Hz	120Hz
ForsakenMark (D3D)					
640x480	49.17fps	54.43fps	54.65fps	108.03fps	114.66fps
800x600	36.13fps	39.94fps	40.08fps	58.35fps	112.69fps
1024x768	28.12fps	Failed	Failed	Can't run	79.23fps
X (D3D)					
640x480	56.58fps	79.23fps	79.14fps	91.15fps	95.38fps
800x600	43.09fps	56.53fps	59.52fps	81.26fps	92.64fps
1024x768	30.11fps	36.93fps	38.63fps	57.32fps	71.05fps
Turok v1.01 * (D3D)					
640x480	23.1fps	32.2fps	32.6fps	64.0fps	79.9fps
800x600	24.4fps	23.5fps	23.7fps	44.9fps	68.8fps
GLQuake II v3.14 (OpenGL)					
640x480	24.8fps	24.5fps	24.8fps	54.9fps	64.4fps
800x600	17.6fps	17.2fps	17.1fps	42.5fps	59.6fps
1024x768	11.1fps	14.2fps ***	14.0fps ***	Can't run	44.5fps
GLHexen2 (OpenGL)					
640x480	7.8fps	15.9fps	14.2fps	40.3fps	46.2fps
800x600	6.2fps	12.4fps	11.9fps	28.9fps	44.4fps
GLQuake (OpenGL)					
640x480	28.0fps	32.4fps	32.3fps	54.4fps	87.8fps
800x600	19.1fps	20.5fps	20.1fps	35.4fps	61.5fps
fill-rate	28.40Mpixels/sec	19.28Mpixels/sec	22.72Mpixels/sec	48.00Mpixels/sec	96.16Mpixels/sec

** This is a new version (1.01) of the Turok-Dinosaur Hunter demo. Previous tests were conducted with 1.0 of the demo. Do not compare old frame-rate results with these new scores. ** ATI supplied us with its first rev (1.0.0) of beta ICD OPENGL32.DLL file for these benchmark results. These drivers are far from final. "*** Due to lack of memory, Z-buffer errors occurred. NOTE: "Can't run" denotes an intrinsic hardware limitation; "Failed" denotes that either the benchmark or the game itself fails to run when it otherwise should.*

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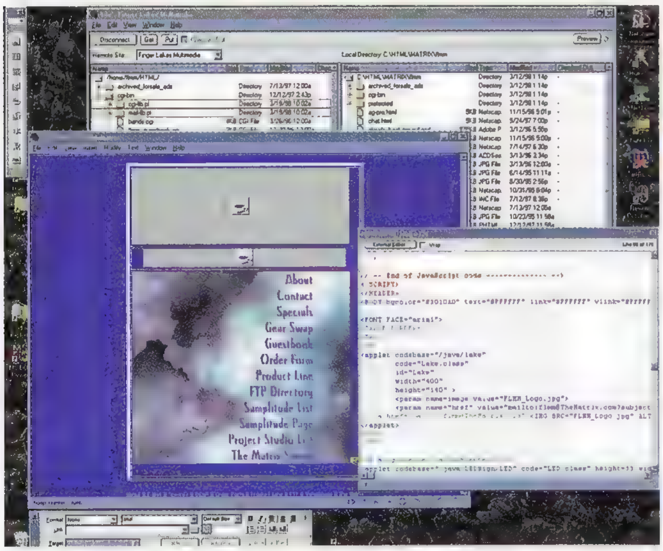
Macromedia **Dreamweaver** 1.2

A webmaster's dream

Finally, web tools designed with the professional site in mind, as opposed to the amateur web page. *Dreamweaver* is the first product that caters to both visual designers and code monkeys. It has a multitude of tools for the "roundtrip" manipulation of HTML on the fly, without mangling existing code. This alone warrants serious consideration.

Once a "site" (or project) is created, the fun begins. Need a Frameset? No problem. Simply split the page and drag the bar. Repeat as needed. How about a Table? Just drop one in and resize as desired, adding cells on the fly. Typing in the cell causes it to autoresize, or not—you decide. Oops, you didn't mean to do that? Guess what? Unlimited undo.



Borrowing the free-floating palette from operating systems, Dreamweaver *requires a large desktop to contain them all.*

The product has plenty of extras for designers assigned to large projects, such as firewall support, a rudimentary checkout system (for when multiple coders are working on the same site), a link checker, document weight, and the list goes on. Where *Dreamweaver* really excels is in DHTML support, including Layers, Style Sheets (sans font previewing), Time Lines, and JavaScript. There are about 15 "behaviors," with new ones available and user-definable, for common coding tasks such as switching web pages based on the browser or those trendy rollover button highlights. In fact, most every part of the program is customizable by simply adding components to the proper directory. Talk about future expansion possibilities. NetObject's *Fusion* tried to implement Libraries to store bits of frequently used HTML code, such as page headers and footers, but here they're done right. Make a change in the Library, and it propagates to every page that uses it.

So why only a 9? The Visual Interface Window (VIW) doesn't display GIF animations, Java, or plug-ins, instead showing a little icon as a place holder. It's a bit annoying that links aren't live, so the VIW can't be used to traverse various pages, but pages can be externally browsed, circumventing this annoyance. Also, should you require more powerful source code editing features, *Dreamweaver* seamlessly integrates with the included *HomeSite 3.0*. Selecting an image doesn't show a thumbnail.

Despite that, *Dreamweaver* is still "wicked cool" (to quote columnist Shel Kimen) and well worth the investment. Macromedia has a powerful tool for real webmasters and is actively working on improving it with frequent version updates and hooks into products such as its forthcoming *Fireworks*. It may be a bit too complex for newbies, but then again, this isn't for them; it's for us pros.

—Daevid Vincent

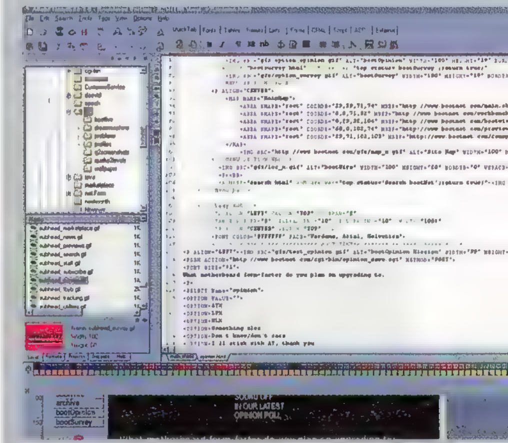
Price $300
Company Macromedia
Phone 415.252.2000
URL www.macromedia.com

boot verdict 9

Allaire **HomeSite** 3.0

There's no place like home

HomeSite 3.0 is by far the best editor we've ever used—hands down. This is the only editor we know of to support full Regular Expression matching in addition to its robust extended search and replace. Full drag-and-drop functionality, ActiveX, image preview, tag coloring, snippets (i.e. macros), automatic list/table/indentation functions, link validation/checking, document weight, and project management are all superbly implemented. Tag Completion, Insight, and Tips aid in rapid coding. So many options in this program are user configurable, it's nearly overwhelming.



***Every conceivable window is available onscreen and most are palettable in* HomeSite.**

HomeSite's few flaws may seem trivial on the surface, but these nuisances cost time to fix and work around. Case is not preserved in filenames and typed-in text in drag-and-drop operations, or in many of the requestor dialogs. The font dialogs don't preview the font chosen (barring the cascading style sheet wizard). Dragging audio files onto the document didn't produce an <EMBED> tag, while doing the same to a graphic results in an <IMG> tag. Also, the <EMBED> tag lacks any options other than source (but no file requestor), width, height, and hidden fields. And you can't re-edit style tags, tables, frames, and so forth back in HomeSite's wizards or dialogs once placed, as you can with other highlighted native tags. Finally, there should be an option to spawn an external nonresizable browser at the common resolutions of 640x480, 800x600, and 1024x768. While the overall package is strong, we found these features lacking.

This is one of those rare cases where the product actually raises the bar all other products have to clear. It opened our eyes to features we can't believe we did without for so long. All we can say is, it's about time.

Price $79 FTP; $89 boxed
Developer Allaire Corporation
Phone 888.939.2545
URL www.allaire.com

boot verdict 9

Palm III

The third time's a charm

Entering into its third generation of indispensable PDAs, Palm's latest makes significant improvements but doesn't change radically. Then again, when you're wiping up the floor with the competition (which is headed by Microsoft and its relatively bloated mobile OS), there's no reason to change course radically.

The new Palm III organizer answers the pleas of the many PalmPilot owners who asked for more memory and an IrDA port. Unanswered in this update are improvements to the screen, sound, and the need for massive memory.

With its third iteration, Palm's popular PDA gets even better.

While looking largely the same as previous models, the Palm III has a svelte new case and fits into your hand or a pocket even easier. But don't bother breaking out a tape measure; the Palm III shares the same dimensions as its predecessors. This time out the bottom and backside of the unit have been tapered for superior ergonomics, and the case has been reengineered for more sturdiness. The Palm III still works with the prior model's modems and cradles (although the Palm III's slender fanny makes the connection precarious).

Also in on the protection racket is the Palm III's new flip-top lid, which protects the screen and, like the classic reporter's notepad, gives you a degree of privacy while taking notes. And its sculpted design adds relatively no bulk to the device.

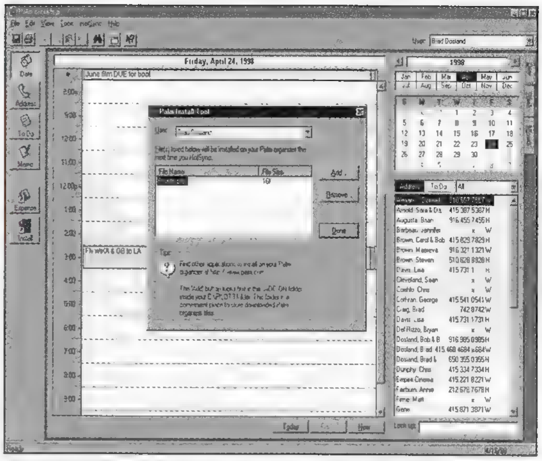
A subtle (but valuable) case improvement is the spring-loaded cover that protects the PDA's gold connectors. And the up/down buttons centered under the screen have been replaced with a toggle that's much easier to use.

The nested stylus also underwent a facelift this time out, with a post-modern metal shaft added to the mix. But form follows function and the cosmetics actually house improvements. The new shaft adds much-needed heft to the tool, and the plastic tail now screws off to reveal an handy pin for hard resets on the road.

IrDA beam times	
40K app	15 sec.
20K app	10 sec.
10K app	5 sec.
individual records	2 sec.
entire categories	5 sec.

Under the hood, the same Motorola Dragonball engine powers the Palm III, but the tank has been expanded to 2MB, double the previous capacity. Active Piloteers who have grown addicted to TRG's SuperPilot memory upgrades will find the extra elbow room a welcome relief, but a 4MB model is desperately needed from 3Com.

The most notable hardware addition is the IrDA nub located at the head of the Palm III. Unfortunately Palm balked at enabling IrDA HotSyncs via the new port, limiting the feature to PDA-on-PDA action. But that action is still pretty hot. Holding the address button for over two seconds automatically sends a record flagged as your business card to another Palm III's address book in little more than a second. Genius. And distance doesn't affect transfer times (although stray beyond 40 inches and you'll lose the connection).



Version 3.0 of the Palm Desktop app allows you to install new programs into your Palm III without the hassle of a stand-alone utility.

There are a few limitations, though. Records can't be transferred from any app that doesn't include the "beam" menu command, which basically means the feature doesn't work with any of the hundreds of pre–Palm III apps that make the platform so valuable, including must-haves such as *HackMaster* and *AportisDoc*. Savvy apps will undoubtedly add support going forward.

Also, a copyright flag allows developers to block the transfer of commercial apps.

On screen, matters look much the same with the new Palm PDA, but significant improvements lurk beneath the surface with Palm OS 3.0. Apps can now be categorized on different screens and screens can be displayed either with the familiar icon-based views or via an efficient new list mode. And a new horizontally scaled bold font has been added to the mix.

When it comes time to migrate to version 4.0 of the OS, the Palm III is flash upgradable. No more patches or memory chip replacements.

Toss in a CD-ROM full of third-party apps and utilities, an improved desktop interface (which includes integrated app loading), enterprise support such as remote server file linking, and it's apparent that round three goes to Palm. If you're a current Pilot or PalmPilot owner and your appetite's been whet, 3Com offers upgrade options. Check the web site for details.

—Brad Dosland

Price $399
Company 3Com
Phone 800.881.7256
URL www.palmpilot.3com.com

boot verdict
9

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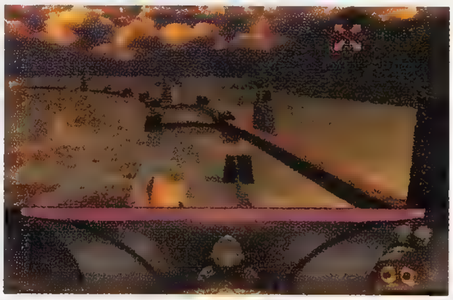
The **Journeyman** Project 3: **Legacy** of **Time**

Riven on steroids

In *The Journeyman Project 3: Legacy of Time*, Red Orb addresses one of the chief complaints levied against adventure games such as *Myst* and its sequel *Riven*—the placid slideshow players see as they plod back and forth between exquisitely prerendered scenes. By using SmoothMove technology from Infinite Pictures, *Journeyman* gives players a 360-degree view of the world.



Journeyman *takes the neckbrace off adventure games.*

Imagine a QuickTime VR view of a prerendered image you swivel around in. Click on a hot spot or avatar in the panorama, and *Journeyman* transitions to video that shows the character moving to the next point, interacting with a character, or shimmying down a ship's mast. The effect is impressive and a much needed improvement in immersion.

While the game breaks new ground for adventure-game technology, it's still the same old tedious go to point A, pick up a puzzle piece, trundle over to point C, put puzzle piece down. Nope, wrong piece, go back to point A and begin again. A double-speed mode picks up the pace but sacrifices some smoothness.

Character interaction is also limited to video, yes, no, and yo-mama responses. Again, nothing new here. Although the players can look in different directions, what they can do and where they can go is finite, and it feels like it. It's like a tour of the interior of Red China: while you can gaze at lush scenes in all directions, you can only go where the guards herd you and no further.

Journeyman also takes a ding for the badly dithered images. While transitions are much smoother than *Zork Grand Inquisitor*, *Zork* uses more animations. *Journeyman* does allow you to pan up and down, unlike *Zork*, which limits you to one view.

Myst and *Riven* fanatics won't want to miss this game, but for those hoping for an adventure game that finally rocks your world, this isn't it.

—Gordon Ung

CHECKLIST
The Journeyman Project 3
Version: 1.0
Max Res/Color 640x480/16-bit
Win95/MacOS System 7.5
DirectX
DirectDraw DirectSound
DirectPlay DirectInput

Price ***$50***
Company ***Red Orb***
Phone ***800.567.2610***
URL ***www.redorb.com***

boot verdict
7

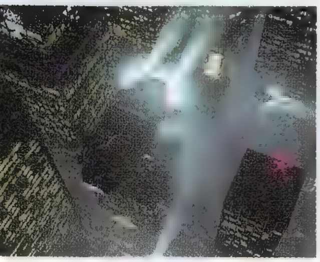
Tex Murphy: **Overseer**

Film noir meets DVD-ROM

CHECKLIST
Tex Murphy: Overseer
Version: 1.0
Max Res/Color 800x600/16-bit
Win95
3D Acceleration
Direct3D
DirectX
DirectDraw DirectSound
DirectPlay DirectInput
Multiple CDs/One DVD

Usually, we associate "interactive movies" with lagging load times, cheesy graphics, a convoluted story, and bad acting. That's why *Tex Murphy: Overseer* is so refreshing. It mixes the latest technology with a character-driven plot and believable performances.

Overseer is billed as the first game designed for DVD-ROM (it also ships with a CD-ROM version). It's also the first to use Digital Dolby's 5.1-channel surround sound. In addition to a stirring AC3 score, it includes more than four hours of MPEG-2 video. Compression is more aggressive than a movie DVD's, but still looks, sounds, and feels like a movie.

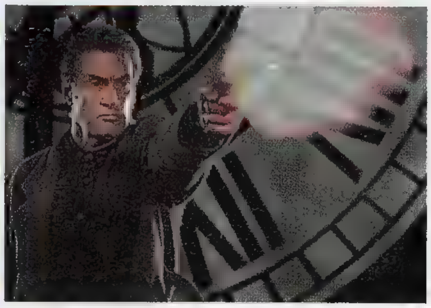


The year may be 2043, but **Tex Murphy: Overseer** ***feels like a Raymond Chandler detective novel from the 1940s.***

The 3D graphics engine is similar to *The Pandora Directive* but is tweaked for better performance. Access uses large textures instead of tiling small textures, so the overall look is more realistic.

On a 266MHz P-II with 32MB RAM, a 24x CD-ROM drive, and a 4MB ATI AGP card, *Tex* averaged around 24fps. We also tested it on a P120 notebook with 32MB RAM, a 4x CD-ROM drive, and 2MB of video RAM, where it coughed up choppy frame rates during the interactive scenes. Frame rates dropped to about 3fps when we moved quickly around the room.

Video sequences play at the same 800x600 resolution on a CD-ROM system with AGP as on the DVD-ROM, though you get simulated surround sound courtesy of Intel's RSX technology. Picture quality was identical. But AGP-less CD-ROM systems are limited to 640x480. The game's dependence on large textures means AGP gives frame rates a bigger boost than DVD.



Big Jim Slade is gunning for Tex. And someone is about to have a close encounter with a large clock.

The complex murder mystery occasionally sags when you get to the puzzles. And because some of the 60 puzzles are hard as nails, Access included a path to bypass most of them. There are also built-in hints.

Still, at this rate, interactive movies might just overcome their rep.

—David English

Price ***$80***
Company ***Access Software***
Publisher ***GT Interactive***
Phone ***800.793.0073***
URL ***www.accesssoftware.com***

boot verdict
8

Starcraft

Orcs in Space

CHECKLIST

Starcraft
Version: 1.0

Max Res/Color 640x800/8-bit

MS-DOS/Win95/NT Compatible

DirectX

DirectDraw	DirectSound
DirectPlay	DirectInput

Multiplayer

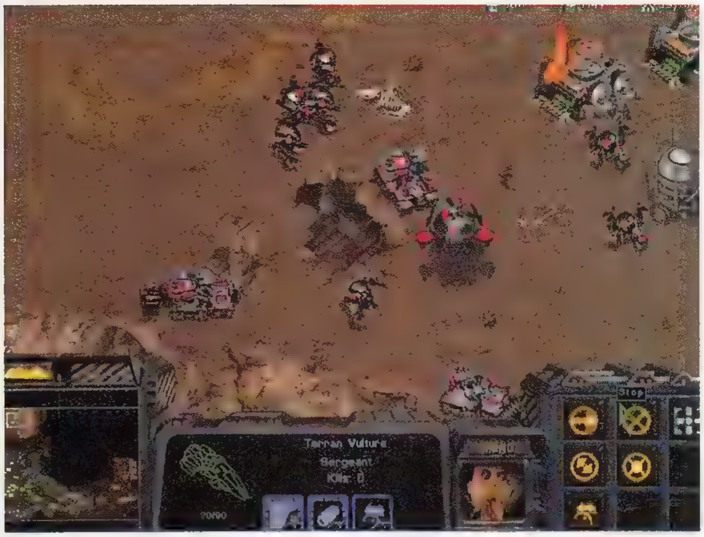
Modem	Direct/serial
TCP/IP	IPX

Following the success of *Warcraft*, Blizzard promised to take its epic conflict to a new level with the intergalactic sequel, *Starcraft*. Alas, while the neighborhood has changed with this latest realtime strategy game, not much else has. But given the addictive nature of the original series, that's not necessarily a bad thing.

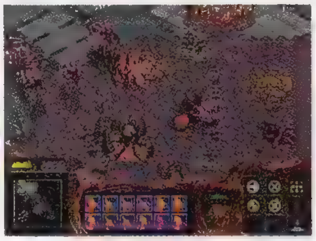
If you've played either of the *Warcraft* games, you'll feel right at home here. The interface is the same, old drag-the-box-to-select-units routine, and that's mostly a Good Thing. It's slick, intuitive, and transparent. Due to the isometric nature of the display, picking units that are hiding behind other units can be trying. When a new icon appears, it practically explains itself (which is good, since the manual is long on back-story detail but laconic about gameplay).

Locked in at a 640x480 isometric view, *Starcraft*'s graphics are more evolutionary than revolutionary. While *Starcraft* does introduce variable height and true line-of-sight to the *Craft* universe, realtime strat games such as *Total Annihilation* and *Dark Reign* have already been there. Still, the translucent pyrotechnic effects and mondo frames of animation per unit do give *Starcraft* a clean, polished look.

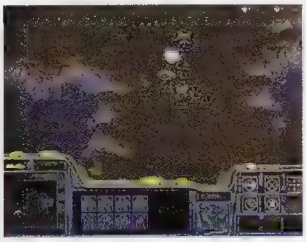
With hard-bitten Terrans, insectoid predators, and powerful but enigmatic psionic beings in the mix, you can bet the sprites will fly fast and furious. You can play the full 30-mission game from any species' point of view, and you'll experience three radically different campaigns. Much of the fun derives from figuring out effective strategies based on the aliens' bizarre and sometimes wacky attributes. Combat takes place on planetary surfaces, in space, and inside the depths of dark, creepy, space stations. The scenarios are nicely varied. Some battles are epic in scale, requiring the deployment of hundreds of units and many hours of playing time, others are small-scale commando raids requiring stealth and audacity.



Starcraft ***has a look and feel that is similar to the*** **Warcraft** ***series.***



Pulsing hives are part and parcel to the Zerg's base of operation.



Intense combat scenes await you in **Starcraft.**

Despite the variety of missions, often times you'll be drawn back to working basic realtime strategy skills—find your resources, harvest them, wait until you gain enough of them, then use them either to build more units or construct buildings that'll help build more units. You've seen it all before.

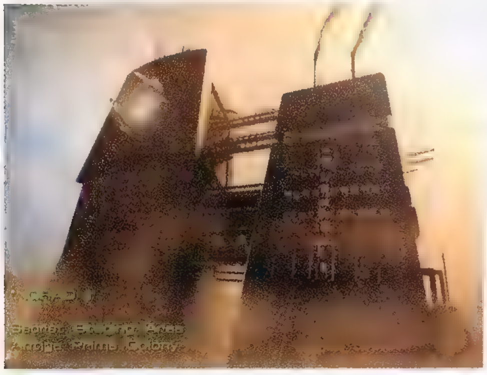
And it has some major (and curious) failings: You cannot zoom the main map, which makes it almost impossible to locate a specific unit during a big engagement without giving it a hot-key designation in advance. Nor is there an inventory screen to inform you about your total strength in various unit-categories. Unit formations are also sorely missed, so combat inevitably turns into a war to see how many combat units you can throw at an opponent.

The campaign editor, however, is almost worth the price of admission all by itself. Based on a sophisticated event-trigger system, it's amazingly powerful and subtle, enabling you to create anything from a single quick-and-dirty skirmish to a huge 20-game campaign. For non-programmer types, it can be fairly daunting, but Blizzard has included a solid tutorial that walks you through all the necessary concepts. This feature also gives the basic game tremendous replay value.

Starcraft is primarily designed for online multiplay, and Blizzard's Battle.net arena lets you play for free as long and as often as you like—assuming, of course, that you can tolerate the company of the get-a-life teenagers who hang out there. Even so, solitaire play is surprisingly addictive. Sure, the scenarios are scripted and sometimes you can psyche out the AI, but sometimes it surprises you with bold, unexpected, tactical moves.

Starcraft may disappoint RTS gamers hoping for a quantum leap, but most players will get their money's worth. Blizzard has included every promised features and delivered a clever, addictive, rock-solid strategy game.

—Bill Trotter



The narrative thread is surprisingly strong.

Price ***$45***
Company ***Blizzard Entertainment***
Phone ***800.953.7669***
URL ***www.blizzard.com***

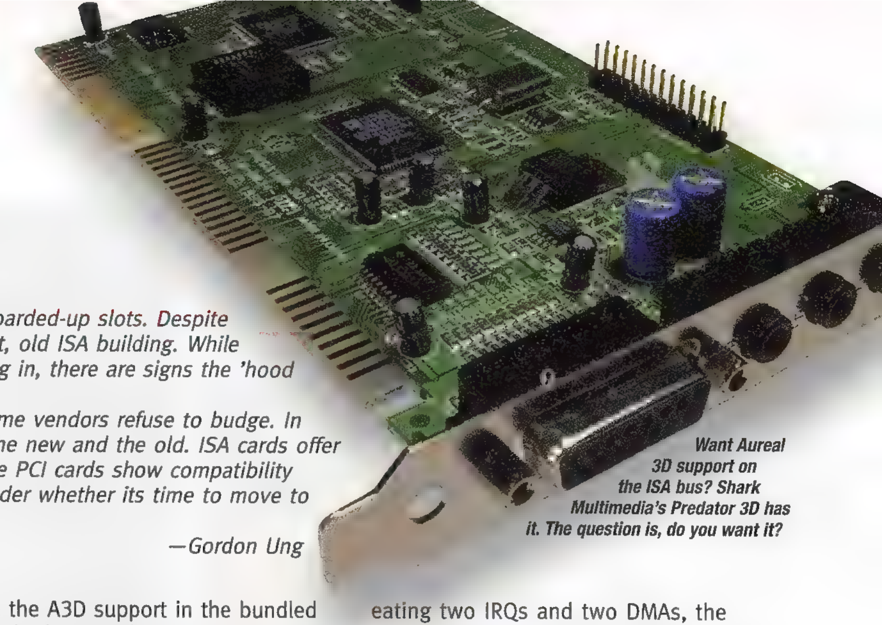
boot verdict
7

Soundcards

Low bandwidth, limited audio channels and empty, boarded-up slots. Despite these limitations, there are still tenants in the decrepit, old ISA building. While the neighborhood has improved with PCI cards moving in, there are signs the 'hood is what you would call "transitional."

And despite promises of a sparkling new order, some vendors refuse to budge. In this roundup, we show you the differences between the new and the old. ISA cards offer up all they can but still fall short in features, while the PCI cards show compatibility issues still need to be ironed out. For those who wonder whether its time to move to PCI sound, the answer is now.

—Gordon Ung



Want Aureal 3D support on the ISA bus? Shark Multimedia's Predator 3D has it. The question is, do you want it?

Shark Multimedia **Predator 3D**

The Predator 3D is an odd hermaphrodite. Taking an organ from newer PCI soundcards, the Predator offers cutting-edge Aureal3D support in the body of an ancient ISA bus card.

The Predator leaves wavetable support to an internal header for Wave Blaster compatible daughtercards, but you can't help but wonder why any card would cost $79 without hardware wavetable support these days.

With that in mind, the Predator 3D has the teeth for the generic Sound Blaster Pro crowd who aren't hardcore about MIDI or games. Using Analog Devices' 40MIPS ADSP-2181, the Predator churns out Aureal 3D effects for simulated 3D sound.

Activate the A3D support in the bundled *Jedi Knight* demo and you'll see why 3D sound is coming on strong. Swivel in short arcs and the sound of blaster-fire whizzing by moves in the same short arc.

The Predator 3D snapped up our frame-rate tests in both versions of *Quake* and in *Forsaken* without a hiccup. Support for three digital joysticks passed with flying colors, and CPU utilization rates were within range of the other cards in this roundup.

Almost as sparse as the barebones documentation, the Predator 3D has two inputs for CD-ROMs and an input for a modem, but nothing more. Bracket outputs are SB-standard in, out, and microphone. And as expected, the card handles legacy SB Pro games without a hitch. But after eating two IRQs and two DMAs, the Predator needs to go on a diet.

Shark has introduced a PCI version of the Predator 3D at the same price, but for those who can't wait for A3D support in an ISA package, the Predator may be the only choice.

THE STATS Signal/noise ratio 80dB | Total frequency response: 20Hz–20kHz
THE BUNDLE Win95/NT drivers | Jedi Knight: Pathways to the Force

Price **$79**
Company ***Shark Multimedia Inc.***
Phone ***800.800.3321***
URL ***www.sharkmm.com***

boot verdict 6

Creative Labs **Sound Blaster** PCI64

At last, Sound Blaster on the PCI bus is within reach. Rats, foiled again. It's just the Ensoniq AudioPCI cross-dressing in Creative Labs garb.

This month, it's déjà vu all over again at Creative Labs.

If you read the review of the Ensoniq AudioPCI S5016 in *boot* 20, you already know the Sound Blaster PCI64. They're the same card. Although Creative Labs initially denied this, you can peel the Sound Blaster sticker off the Ensoniq ES1370 Controller chip. During our tests, we swapped an AudioPCI with the Sound Blaster PCI without problems.

So what are you getting for the extra $20? Polished drivers and better support.

When the S5016 hit the streets last February, the maximum soundset you could download into memory was 4MB. Creative has upped the maximum to 8MB.

The card previously didn't support acceleration of DirectSound or DirectSound 3D. Although the ES1370 isn't a true DSP, Ensoniq used a software workaround to support the acceleration and claims it's more efficient than some hardware DSP solutions. We had no problems pumping more than a dozen 44kHz wave files simultaneously through the card, although we'll see how effective this will be as demands on PCI soundcards increase.

Although it isn't Aureal3D compliant, the PCI64 supports DirectSound 3D in two- or four-speaker mode. With Ensoniq's AK4531-VQ codec, the PCI64 uses the line-in 1/8-inch jack on the bracket as an output. Ensoniq/Creative has provided headers for a CD-ROM, TV tuner, and modem. There's no hardware wavetable header in on the card, but who needs it with 64 voices onboard?

MIDI quality is first rate, and the card ran through our digital joystick obstacle course without a problem. AMD K6 users are advised by Ensoniq that there is a problem with DOS legacy games that won't be fixed on AMD silicon until August.

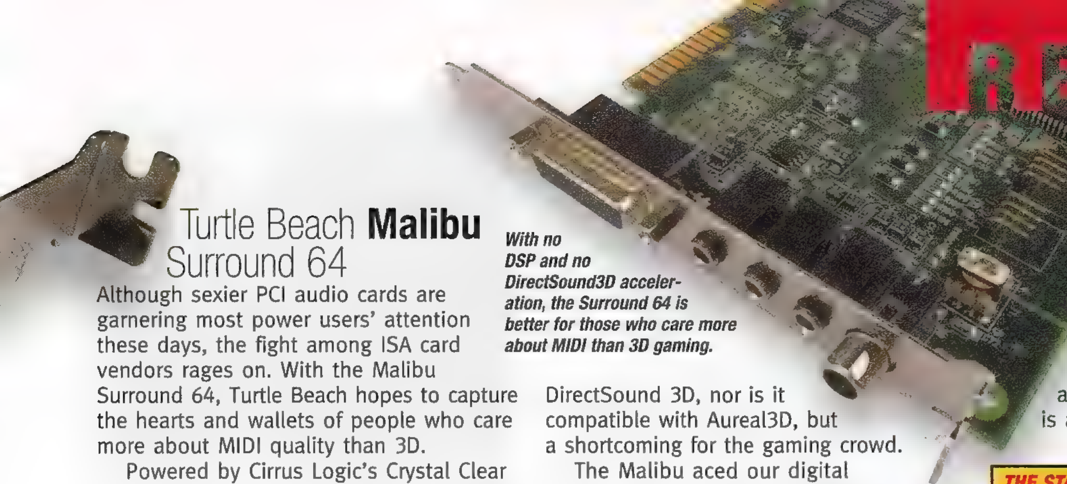
The card breezed by our DOS legacy tests, but we did have problems with the ForsakenMark that could only be corrected by running six-month-old Ensoniq drivers. The card is also resource-light. By sharing IRQ 7 with the printer, the card occupies only one IRQ and one DMA.

If you can stomach paying for a "brand new" SoundBlaster that's really a year-old design from Ensoniq, it's not bad.

THE STATS Signal/noise ratio: 90dB | Total frequency response: 20Hz–22kHz
THE BUNDLE Win95/NT4 drivers | Multimedia Deck | Creative Inspire | Microsoft NetMeeting | WaveStudio and Configuration Manager

Price **$99**
Company ***Creative Labs***
Phone ***800.998.5227***
URL ***www.creativelabs.com***

boot verdict 7



Turtle Beach **Malibu** Surround 64

With no DSP and no DirectSound3D acceleration, the Surround 64 is better for those who care more about MIDI than 3D gaming.

Although sexier PCI audio cards are garnering most power users' attention these days, the fight among ISA card vendors rages on. With the Malibu Surround 64, Turtle Beach hopes to capture the hearts and wallets of people who care more about MIDI quality than 3D.

Powered by Cirrus Logic's Crystal Clear CS4237B and a 4MB Kurzweil set-in ROM, the Malibu turns out good MIDI tunes. Using a technology called VSL, the Malibu pumps 64 voices by layering the second 32 voices over the first 32. Although the effect pulls out fuller sounds, it's hard to say whether it truly sounds better. Some may like it, while others may say nay.

The CS4237B processes SRS 3D surround sound effectively, but the card doesn't accelerate DirectSound or DirectSound 3D, nor is it compatible with Aureal3D, but a shortcoming for the gaming crowd.

The Malibu aced our digital joystick tests and Sound Blaster legacy tests without a problem. The card offers internal connectors for a CD-ROM and one auxiliary input. There's no hook up for video or modem input, but Turtle Beach does give you an external S/PDIF output for recording to a DAT. There's also no way to add expansion RAM. The Malibu occupies one IRQ and two DMAs.

The Malibu does have an interesting PCI expansion port on it, but said doesn't have plans for it at this point. Until you see some hardware on the table, this is just a feel-good expansion port.

For those on the prowl for the poor-man's AWE64 and don't care about DirectSound 3D, the Malibu is a solid candidate.

THE STATS Signal/noise ratio: 92db | Total frequency response: 35Hz–20kHz ***THE BUNDLE*** Win3.1/95/NT drivers | Voyetra MIDI Orchestrator Plus | AudioStation 2 | AudioView | MIDI Orchestrator | Jam Grid | AudioCalendar | Say It

Price $79
Company Turtle Beach
Phone 800.233.9377
URL www.tbeach.com

boot verdict 6

Orchid Technology **NuSound 3D**

The NuSound could've used four-speaker support and better MIDI, but can you say no to a card that supports the major Win95 feature sets for $69?

Its DSP's stamped with the Aureal logo, so you know this card's gonna be hot. Pumping out A3D sounds with a 300 MIPS Vortex AU8820 DSP, the NuSound accelerates the major sound 3D standards of DirectSound 3D and Aureal3D.

The NuSound 3D shows how fast the PCI soundcard category is maturing. Almost every feature is checked off. Full DLS support: got it. Legacy Sound Blaster support: got it. 64-voice wavetable synthesis: got it.

The card bracket holds 1/8-inch jacks for in, out, microphone, and 15-pin MIDI/joystick controller. A generous portion of internal headers for CD-ROM, aux, video, and modem are supplied. The card can only lock in a maximum of 4MB of system RAM for MIDI samples using the PCI bus. Orchid says it's a limitation of the chipset.

The NuSound 3D failed to recognize our Microsoft Force Feedback Stick and Thrustmaster Rage. Orchid said the shipping drivers should recognize the Force Feedback and it would investigate the problems with the Rage.

Frame rates buzzed along nicely with no problems in legacy DOS gaming. Interestingly, both the NuSound and Sound Blaster PCI64 pushed out CPU rates in the 6% range, comparable to the Predator 3D and Malibu Surround 64. PCI soundcards in the *boot* 20 roundup turned in CPU rates in the low 4% range. The 2% is negligible, though.

The NuSound takes a hit for being a resource hog, as it snarfs up two IRQs and two DMAs. The card loses another point for its lackluster MIDI quality. The supplied MIDI patches sounded downright ho-hum, with the horns turning in a garish synth sound.

Still, with two of the major 3D sound schemes supported and a deadly price, the NuSound is a worthy contender.

Test	Malibu Surround 64	Predator 3D	Creative Labs PCI64	Orchid PCI
Digital Joystick Compliance				
Microsoft Force Feedback joystick	Yes	Yes	Yes	No****
Thrustmaster Millennium Interceptor 3D	Yes	Yes	Yes	Yes
Thrustmaster Rage3D	Yes	Yes	Yes	No
% CPU Utilization via DirectSound				
Eight mixed signals **	6.28% to 6.82%	6.3% to 6.7%	6.2% to 6.6%	6.31% to 6.8%
Win95 DirectSound Performance (fps)				
ForsakenMark (640x480)	47.86fps	48.74fps	44.34fps**	44.36fps
GLQuake (640x480)	26.6fps	25.5fps	26.4fps	25.3fps
GLQuake II (640x480)	19.6fps*	19.7fps*	19.4fps*	18.7fps*
Win95 Sound Feature Set				
DirectSound accelerator	No	No	Yes	Yes
DirectSound 3D accelerator	No	No	Yes	Yes
Aureal3D compliant	No	Yes	No	Yes
Downloadable Sample (DLS) Compliant	No	n/a	No***	Yes
Adjustable sample RAM	No	n/a	Yes	Yes

*Test system: CPU: Intel Pentium II 233MHz, Motherboard: ASUStek P2L97 440LX, RAM: 64MB SDRAM, O/S: Windows 95 OSR2.1 Build 1212b with DirectX 5. *GL_Flash used to complete this test. **Older Ensoniq PCIAudio drivers used to complete this test because of an incompatibility with the boot ForsakenMark. ***Creative Labs will add DIS compliance if shipped as part of DirectX 6.0. ****The Sound Blaster PC164 does not support true hardware acceleration.*

THE STATS Signal/noise ratio: 93dB | Total frequency response: 20Hz-20kHz ***THE BUNDLE*** Win95/NT4 drivers | Jedi Knight: Ambush at Altyr 5 | Shipwreckers with A3D support

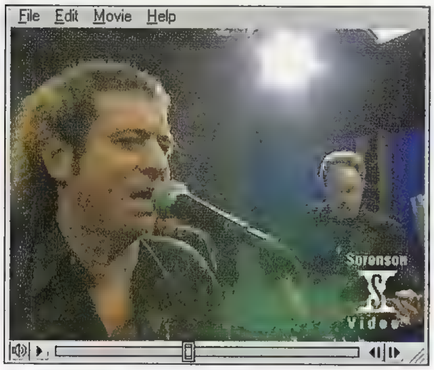
Price $69
Company Orchid Technology
Phone 800.577.0977
URL www.orchid.com

boot verdict 8

QuickTime **3.0** Pro

QuickTime shoots for the big time

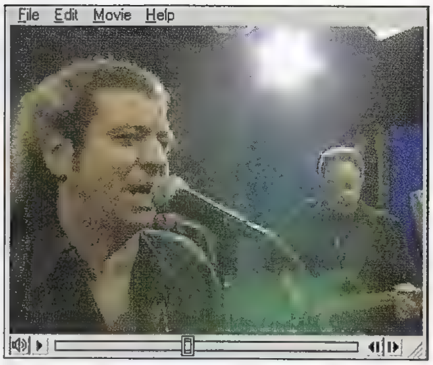
The *MoviePlayer* program in *QuickTime 3.0 Pro* now lets you cut, copy, and paste movie clips together and save them in the QuickTime format. And Sorenson Video's powerful new codec has compression rates of better than 4:1 over Cinepak with little quality difference. A 5.3MB Cinepak clip needs only 1.4MB in Sorenson, making it perfect for streaming video over the Internet. Other *QT3* additions include a compressor from QDesign Music for low-bandwidth audio and a codec that plays clips from DV camcorders.



To show Sorenson's compression quality, we digitized a 30-second clip The entire Sorenson clip size was 1.4MB.

MoviePlayer's Export feature lets you convert from AVI to QuickTime and DV, but you can't go the other way. Even if you give your clip a different extension (such as AVI), the underlying file format is still QuickTime. While this ensures compatibility with both Macs and PCs, saved or exported movies, even those with the AVI extension, will not play in a dedicated AVI player (though they will play under *DirectShow*).

QT3 neither exports nor plays MPEG streams, and the export process always involves recompression, which degrades picture quality. Developers should also disapprove of Apple's new licensing policy: Products shipping with *QT3* must install a nag for upgrading to *QT3 Pro* on the user's desktop. Or you can pay Apple one dollar per disc not to install the nag, or two dollars per disk to include *QT3 Pro*. Apple no longer licenses prior versions of QuickTime for distribution with new products.



We digitized the same 30-second clip with Cinepak. The entire Cinepak clip was 5.3MB.

Still, *QuickTime 3.0 Pro* is well worth the meager $29 upgrade price from the basic edition, which is freely available from Apple's web site or this month's bootDisc.

—*Nels Johnson*

Price $29
Company Apple
Phone 408.996.1010
URL www.apple.com

boot verdict 7

Mysteries Of The Sith

Pathetic help

The Force is flowing again, thanks to LucasArts' *Mysteries of the Sith*—an add-on pack for last year's excellent first-person action/adventure epic *Jedi Knight*. But something was lost along the way.

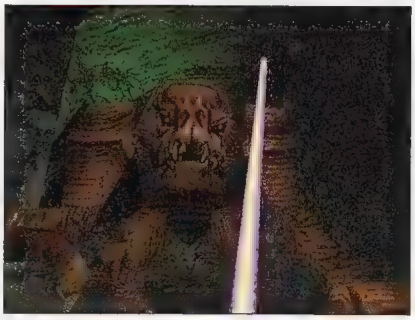
Yeah-more monstrosities to drop! Keep them comin'.

Levels reek of substandard design and texture quality. *MOTS*'s Rebel base is a boring façade of bland textures. It does get better as you progress, though. This time out, CPU-controlled Rebel soldiers "help" you out, but that help is downright anemic. During the course of the first mission, you'll run into a firefight between Rebel soldiers and Imperial stormtroopers. Strip the stormtroopers of weapons via the new Force Pull power, and even then your Rebel buddies can't finish them off.

Thankfully, there are new weapons (including a zoom-in sniper scope and Han Solo's BlasTech DL44 pistol) and baddies to cap, including the massive Rancor.

The RenderDroid/SITH engine that powered *Jedi Knight* has been tweaked to include colored lighting. While some levels benefit from the murky hues, others are way overdone. Don't worry, *MOTS* doesn't patch your original *Jedi Knight*. Gone is the blue-screened FMV of *Jedi Knight*. In its place stand in-game cinematics, where the gaming engine is used to provide cut-scene action. But LucasArts decided to pump the realtime rendered in-game cinematics into a AVI-esque compression scheme and play them back as pre-rendered scenes. This results in pixelated cut-scenes that "almost" look like realtime graphics, but the lossy artifacts floating around solid colors give its compressed nature away.

CHECKLIST
Mysteries of the Sith
Version: 1.0
Max Res/Color 1280x1024/16-bit
Win95
3D Acceleration
Direct3D
DirectX
DirectDraw DirectSound
DirectPlay DirectInput
Multiplayer
LAN Modem Direct/serial
TCP/IP IPX



Your lightsaber is still one of your most powerful weapons in Mysteries Of The Sith, so swing that thing.

Considering the game uses D3D hardware acceleration, using a system's onboard accelerator would have looked infinitely better than this compressed drivel. To add insult to injury, the poorly motioned characters lack animated textures for facial expressions.

Even with the new force powers, multiplayer characters, and deathmatch levels, *MOTS* is hindered by the disjointed story-telling and sometimes weak graphics.

—*Andrew Sanchez*

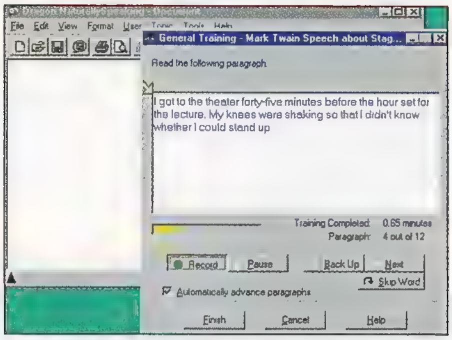
Price $35
Company LucasArts
Phone 888.532.4263
URL www.lucasarts.com

boot verdict 5

Speech Recognition

If I could talk to the executables

Hands-free computing is now an affordable reality. Speech recognition has come a long way: not only can you issue commands to your computer, you can also dictate and be assured your words will be accurately translated into digital text. We looked at the two most popular continuous-speech-recognition software packages available: IBM's ViaVoice Gold *and Dragon Systems'* NaturallySpeaking Deluxe. *—Sarah Pirch*


Dragon NaturallySpeaking - Document
File
Edit
View
Format
User
Topic
Tools
Help
General Training - Mark Twain Speech about Stag...
Record
Pause
Back Up
Next
Skip Word
Finish
Cancel
Help

Read the following paragraph.

I got to the theater forty-five minutes before the hour set for the lecture. My knees were shaking so that I didn't know whether I could stand up

Training Completed: 0.65 minutes
Paragraph: 4 out of 12

☑ Automatically advance paragraphs

You can get started using **NaturallySpeaking** *after only a few minutes of training. This Mark Twain speech is brief but entertaining.*

Dragon Systems' **NaturallySpeaking** Deluxe

Acclaimed for its accuracy and voice-activated editing, *NaturallySpeaking* disguises training as a pleasure—you'll read excerpts from Arthur C. Clarke's *3001: The Final Odyssey*, *Dave Barry in Cyberspace*, or a speech by Mark Twain, among others.

We recommend the full training session and further periodic training to increase accuracy: the more you train a speech-recognition package, the better it gets. After the briefest training, we obtained 83% accuracy. Further training, and a month's use, increased accuracy up to 95%.

The Personal edition of *NaturallySpeaking* is shackled to a limited proprietary word processor reminiscent of WordPad. But the Deluxe edition we reviewed allows dictation directly into *Word* via the *NaturalWord* module available at Dragon's web site, and into almost any Win95-compatible app with the *NaturalText* executable.

On its own, *NaturallySpeaking* lets you edit and format text, control mouse functions, employ natural spelling, create forms and block text pasted with a single voice command, edit macros for specialized use, access the 200,000-word supplemental dictionary, and add your own vocabulary by importing documents or manually adding words. And with the *DragonDictate* module, you can fully navigate your desktop.

The vocabulary expander easily topped *ViaVoice*'s. A list of legal terms we imported was immediately recognized, without a pronunciation key. And compound phrases are recognized as a whole. *ViaVoice* had serious problems with similar tasks.

The Deluxe version also has complete text-to-speech capacity, which works well for proofing. You can also play back recorded speech.

The Deluxe edition includes full macro editing with Dragon's scripting language, a larger active vocabulary (from 30,000 to 55,000 words), and the ability to create specialized vocabulary on multiple topics. Both enhanced versions allow multiple users.

Overall, the specialized modules make *NaturallySpeaking* the more complete package of the two reviewed here. We like Dragon's ease-of-use, training, vocabulary expander, accuracy, and voice-activated text formatting and editing ability.

A Preferred version is also available with most of the Deluxe version's features.

***Price** $109 Personal; $229 Preferred; $695 Deluxe*
***Company** Dragon Systems*
***Phone** 800.825.5897*
***URL** www.dragonsystems.com*

boot verdict 9

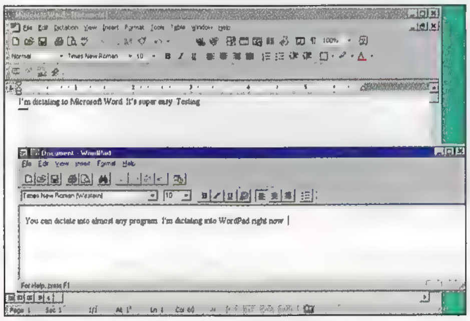
IBM's **ViaVoice Gold**

To get started with *ViaVoice Gold*, plan to invest a minimum of 15 minutes setting up your user profile and training the program.

First, you calibrate your headphone/mike setup—which can take several minutes if you have trouble maintaining a consistent voice volume. Unfortunately, training the software to your speech patterns is quite boring—involving a series of up to 265 sentences that also serve as a tutorial.

After training, *ViaVoice* took an average of 17 minutes to build our individual user profiles, ranging from 11 to 25 minutes. An unlimited number of people can create user profiles and users can create several sub-profiles tuned to various environments.

ViaVoice Gold lets you dictate directly into *Word 97* by adding a dictation menu command upon installation (but we couldn't use Dragon's package with *Word* after this and had to uninstall *ViaVoice*), or you can use its built-in *SpeakPad*.



I'm dictating to Microsoft Word. It's super easy. Testing

You can dictate into almost any program. I'm dictating into WordPad right now.

ViaVoice *works with any Win95-compatible app. The microphone icon on the* **ViaVoice** *toolbar activates dictation mode.*

ViaVoice's discrete dictation mode is a drawback that limits editing; you must switch to edit mode and use your mouse and keyboard to correct mistakes. But you can select, cut, paste, and format text by navigating menus.

Both *NaturallySpeaking* and *ViaVoice* had a tough time with text such as URLs and e-mail addresses, which almost always required manual editing. And if you need to spell out a proper name, acronym, or other nonstandard term in *ViaVoice*, you must use the military alphabet (alpha, bravo, charlie,...).

Both programs sometimes confuse words with other legitimate words that aren't caught by spellcheck. You'll need to proofread all text, which you can do with the system's text-to-speech capability.

Overall, we reached accuracy slightly lower than with *NaturallySpeaking*. After a month's use and training, it increased from an initial 81% accuracy up to 94%.

This new version of *ViaVoice* adds to an already solid application. And while documentation is scant, training was boring, the vocab expander was problematic, and the program still lacks complete, voice-activated editing, we still liked the program's strong desktop navigation features and its practical interoperability with other apps.

***Price** $149*
***Company** IBM*
***Phone** 800.825.5263*
***URL** www.software.ibm.com*

boot verdict 8

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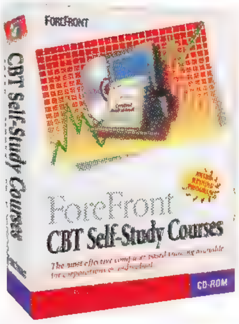

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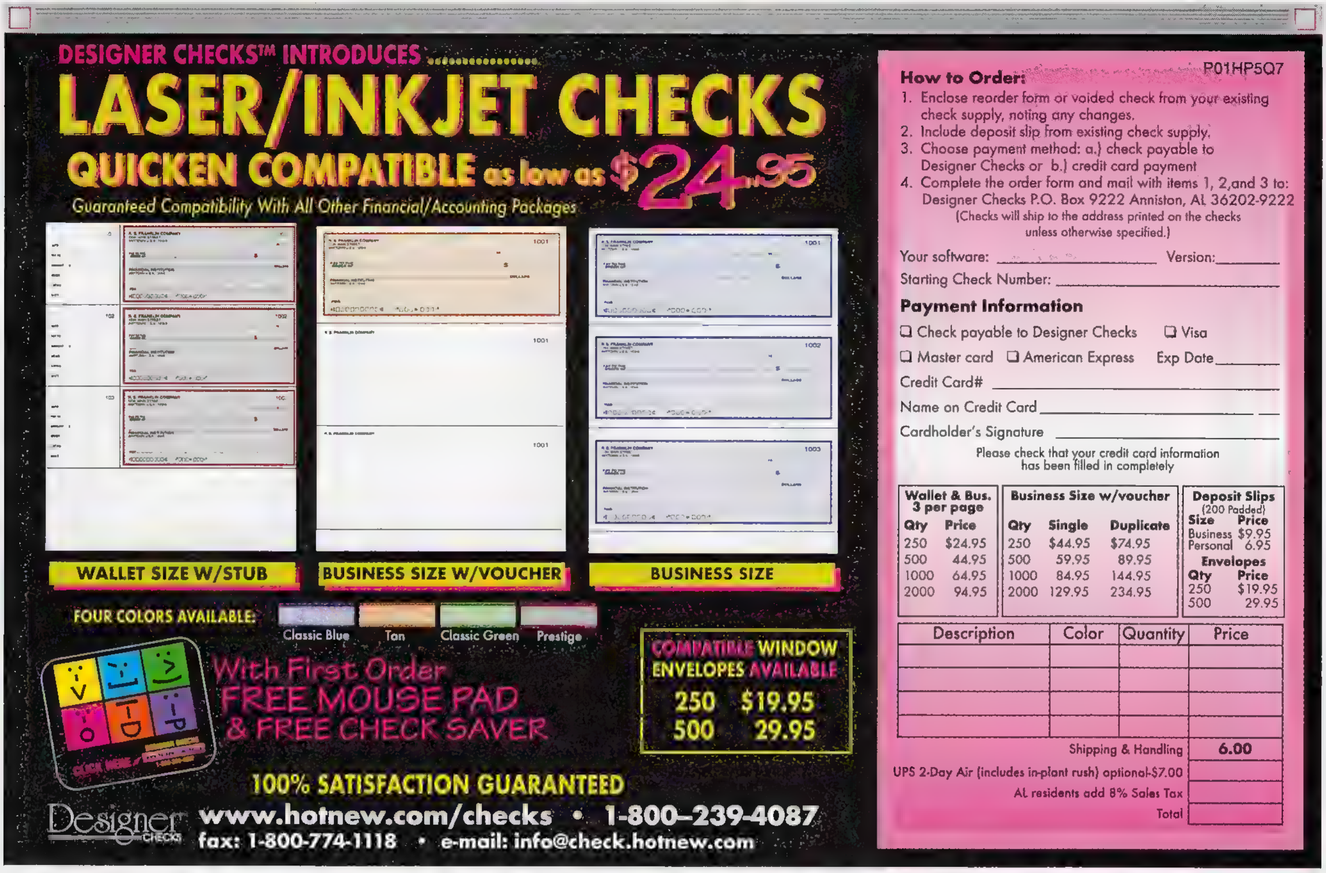

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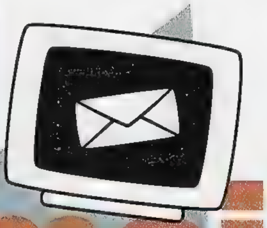

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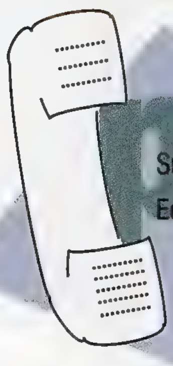

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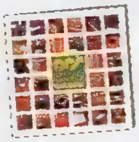

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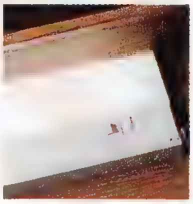
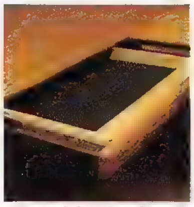


Hidden florescent lights in hutches illuminate work areas.

Power manager lighted switches indicate which components are on.



Pencil drawers have rich felt lining and built in wood pencil trays.

Compartment doors have locks to keep kids or co-workers out.

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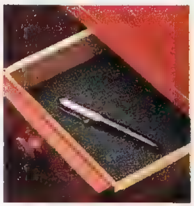

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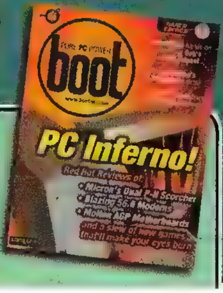

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Q: ***The cup holder on my computer broke under the duress of a large glass of Orangina. Any tips on how I can replace it? When I called CompUSA for advice, they told me they couldn't help.***

—Stanislaus Dingus

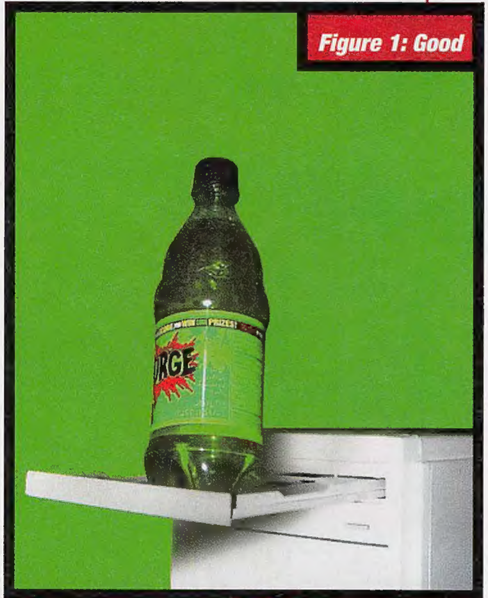


Figure 1: Good

Figure 2: Bad

2 LITERS
SURGE

A: This column shares your frustration. In the poofLab, we've broken cup holders twice—once with a full glass of Ovaltine and once when we foolishly put a potted cactus in one (who knew!). While cup-holder repair should be as easy as a simple parts swap, CompUSA curiously never seems to have the right inventory in stock. Don't wait for a back order that may never arrive—repair the cup holder yourself. During our cup-holder travail, we've found that Krazy Glue works just fine. And of course no one can forget the urban legend about the computer novice who mended his broken cup holder with peanut butter!

Testing in the poofLab revealed that the typical cup holder can reliably hold no more than 20 fluid ounces. Why manufacturers don't make these things stronger is one of computing's greatest mysteries, along with what the squiggly line is called and why the telephone never rings when you're on AOL.

Q: ***How do I change the picture on my monitor's background? I'm tired of looking at the same old blue sky-and-clouds background that I've been staring at since I unpacked my computer. A friend told me I can do it with a control panel setting, but I can't find the right one.***

—Dr. Benjamin Zaius

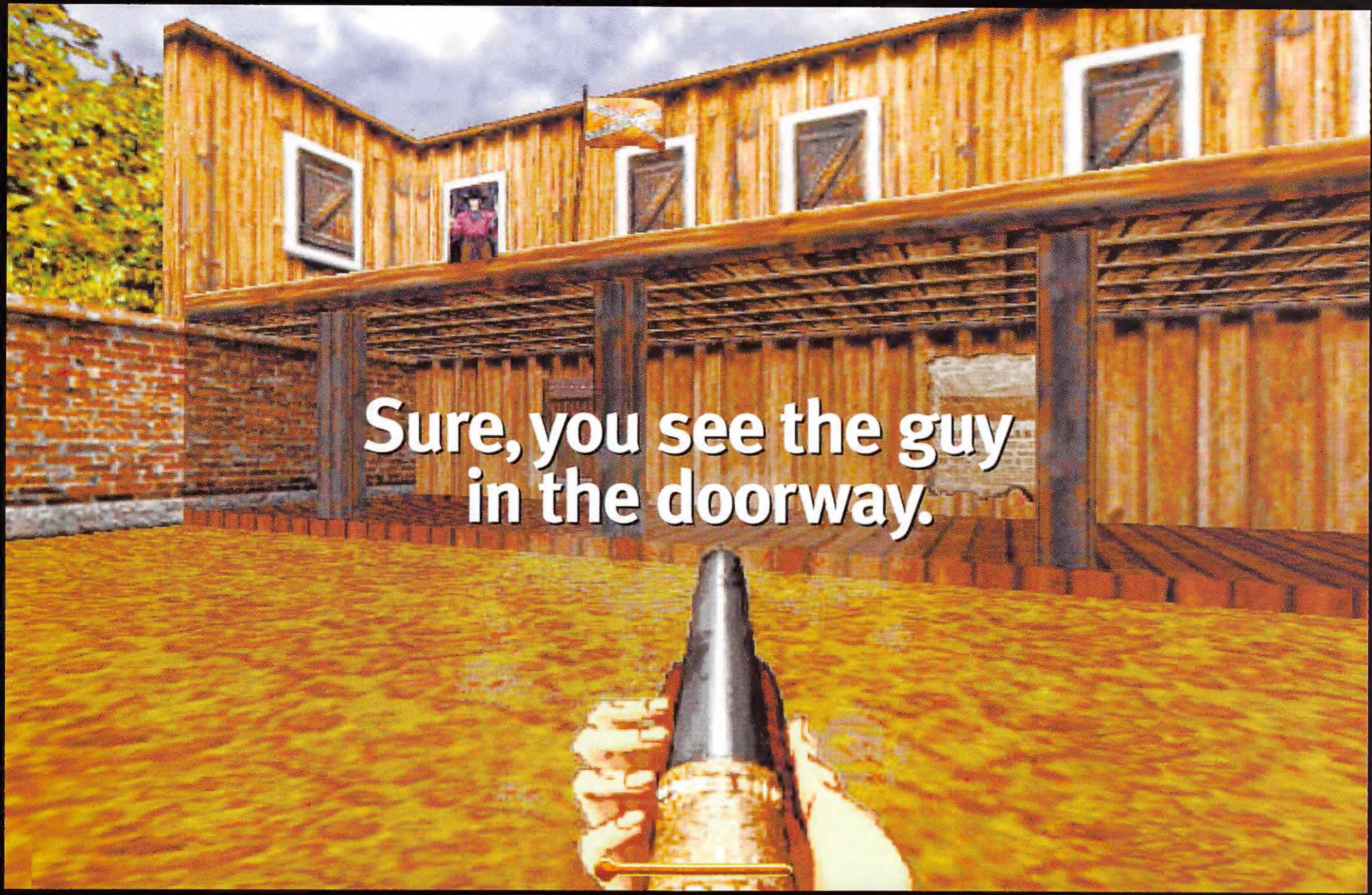
A: Fiddle you might with your Windows control panels, Ben, but this will get you nowhere—unless you're looking for a one-way ticket to the land of broken hearts! As it turns out, you'll have to buy a new monitor. The desktop background is permanently seared into a layer of semi-transparent film that sits between your cathode ray tube and glass screen. And Ben? When shopping for a new monitor, make sure to pick one with a desktop background that you can live with.

Q: ***I turn my computer on but nothing happens. Any suggestions?***

—Poppy Ortega

A: Poppy, Poppy, Poppy, where should we begin? Almost anything could be wrong here, so please ask yourself the following troubleshooting questions:

- Did you smack the power switch with a claw hammer? Wham! Did you smack it? Did you smack it hard? The switch may be broken.
- Have any local earthquakes or tropical storms caused power outages in your area? It's possible your computer isn't getting enough of what we like to call "juice."
- Have intelligent space insects gnawed through your power cord? Happens all the time, Poppy.
- Have you made sure all your cable connections are thoroughly secure with Krazy Glue? Remember, it is the miracle epoxy.
- Do you have a plastic diskette in the business card dispenser? If you have a plastic diskette in the business card dispenser, the computer will tell you that you have an "invalid system disk" and then ask you to do something or other. We can't remember what. Just make sure you don't have a plastic diskette in the business card dispenser. p



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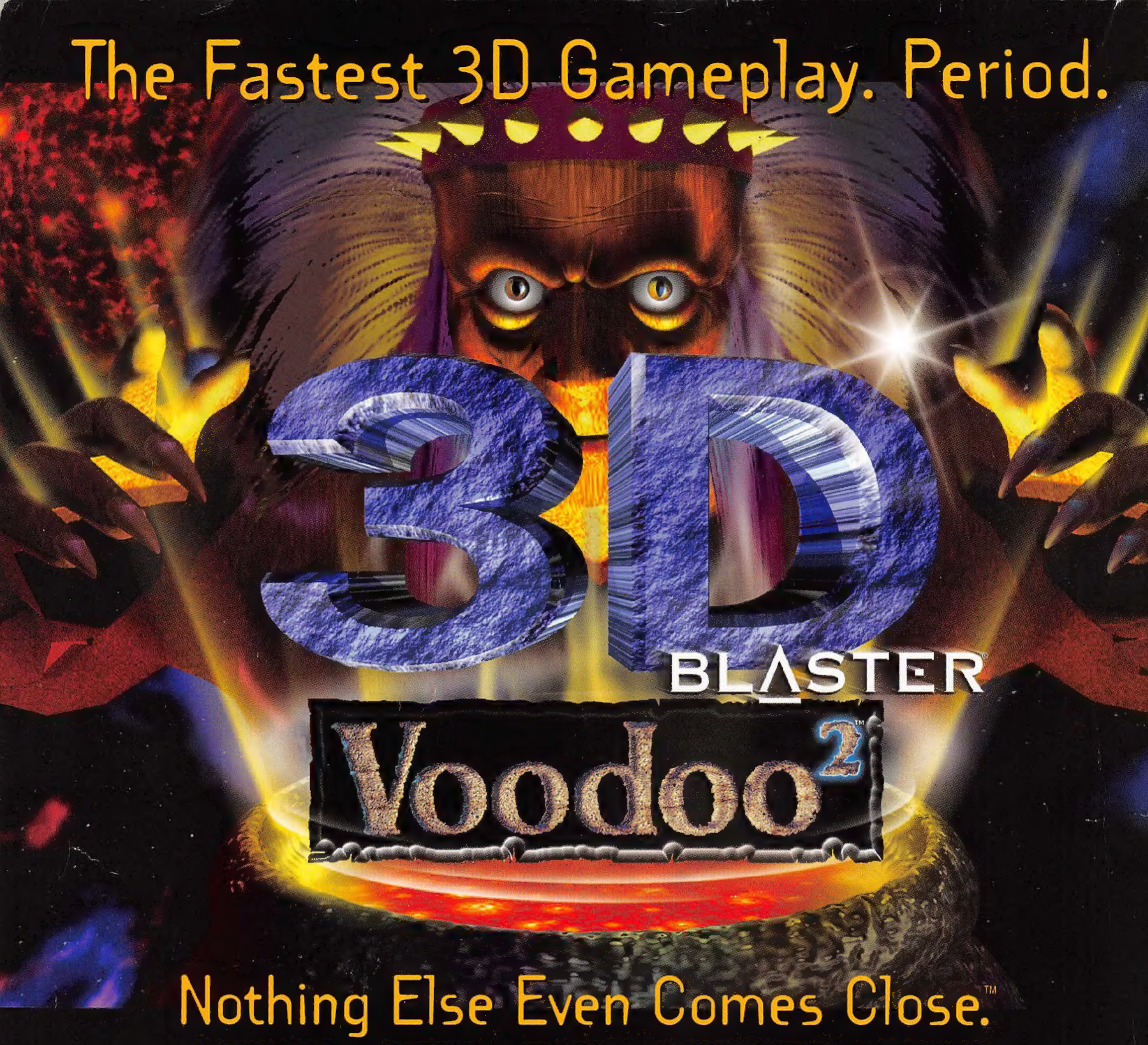

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